AFRICA-CHINA COOPERATION IN CRITICAL MINERALS:

Centering Africa's Development in a Global Race

DEVELOPMENT REIMAGINED

November 2024

DEVELOPMENT REIMAGINED

CONTENTS

DEVELOPMENT REIMAGINED

ACKNOWLEDGMENTS

We are grateful for and acknowledge the opinions and insight provided by our practitioner and expert interviewees that contributed to the thinking and analysis expressed in this report through their own work as well as joint and one-to-one discussions with the team.

However, our opinions, insights, conclusions, recommendations, and errors are ours alone.

Special thanks also go to our excellent researchers Yixin Yu, Rugare Mukanganga, Ovigwe Eguegu and Jiaying Zheng. Hannah Ryder, Leah Lynch and Yike Fu are also to be thanked for help with editing and production.

EXECUTIVE SUMMARY

1. The global transition towards clean and information technologies has significantly increased the demand for critical minerals. Africa, home to 30% of the world's mineral reserves, including many critical to these technologies, has not fully capitalized on its resources. The continent remains primarily focused on raw mineral extraction and captures just 10% of the full value generated by mineral supply chains. To ensure these resources contribute to local economic growth, community development, job creation, and export earnings, it is essential that Africa develops strategies to protect and maximize the benefits from its critical minerals.

2. Critical minerals, though not universally defined, are, in the African context, those abundant on the continent and crucial for economic development, green industrialization, and security. The economic and geopolitical significance of these minerals is profound: they account for nearly 20% of Africa's total exports and contribute to 28% of its GDP. They are also at the center of intensifying global competition, with major powers like the EU, US, and China seeking to secure their supply.

3. China's involvement in Africa's mining sector began in the late 1980s, driven by its growing domestic demand for industrial minerals. Chinese investment in Africa's mining sector has steadily grown, reaching US$9.76 billion by 2022, representing 23.8% of China's total FDI stock in Africa, second only to construction. Copper is the leading target of Chinese FDI in non-energy mining, followed by aluminum and iron. Minerals also dominate the trade relations between Africa and China, with mineral fuels being the largest export category from Africa to China, followed by ores, precious stones and metals, copper, and other base metals. There is also a shift from mineral fuels to higher concentration of minerals and metals.

4. Chinese mining companies represent 8% of Africa's total mining output, a smaller share compared to Western counterparts like the UK and Europe. In terms of mine ownership, China ranks fifth, following the United States, Australia, Canada, and the UK. However, in the past five years, China has expanded its mine ownership in Africa by 21%, while the US, Australia, and Canada have experienced contraction. Trade dynamics also reveal that Africa's mineral and metal exports to China are highly concentrated, whereas exports to the US and EU remain more diversified, consisting of both raw materials and manufactured goods.

5. There is a strong interest across Africa in developing mineral-based industries, particularly those related to electric vehicle (EV) batteries. With demand for EVs projected to increase significantly, the demand for batteries is expected to grow five-fold by 2023. Currently, Africa's role in the EV battery supply chain is largely limited to raw material extraction, while China dominates the midstream processing and downstream production of cells and battery packs. Besides, China has substantial stakes in Africa's lithium, copper, and cobalt mining projects—key minerals for EV batteries.

6. Africa has the potential to build its own battery supply chain, beginning with the production of precursors in resource-rich countries like the DRC, Zambia, and Zimbabwe. Downstream activities, such as battery pack assembly, could take place in countries with or closer to large automotive markets, like Morocco and South Africa. Over time, these links could form a complete supply chain within the continent.

7. Despite the significant role mining plays in Africa-China relations, the Forum on China-Africa Cooperation (FOCAC), the main platform for their cooperation, has not adequately addressed the sector. FOCAC 8 was the first to include a direct reference to mining focusing on value addition for minerals while the recent FOCAC 9 covered the sector more comprehensively,

but still lacking details. China should specify and enhance its commitments to the minerals sector to include geoscience and geology cooperation, Research and Development in mining technologies, human resource training, infrastructure development, value addition and supply chain upgrading. Additionally, China should support Africa's mineral-based industrial initiatives and promote sustainable mining practices that align with international ESG standards.

8. Africa's mining sector faces challenges related to transparency and accountability, which have led to environmental degradation and the displacement of communities in mineral-rich areas. Additionally, African governments often pursue individual bilateral agreements, leading to fragmentation and missed opportunities for a unified approach to resource development.

9. To advance its economies and improve living standards, Africa must harness its mineral wealth through value addition and regional cooperation. African nations should consider adopting a hybrid approach that blends protectionist policies with strategic trade initiatives, and strengthen their collective voice in platforms like FOCAC to advocate for their development priorities and negotiate terms that align with their interests.

ABBREVIATIONS

AfDC	African Development Corridors
AfCFTA	African Continental Free Trade Area
AfDB	African Development Bank
AGMS	African Green Minerals Strategy
AMDC	African Minerals Development Centre
AMGC	African Minerals And Geosciences Centre
AMV	African Mining Vision
AU	African Union
AUCS	African Union Commodity Strategy
BRI	Belt And Road Initiative
CRM	Critical Raw Materials
DRC	Democratic Republic Of The Congo
ECCAS	Economic Community Of Central African States
ECWFS	Economic Community Of West African States
ESG	Environmental, Social And Governance
EU	European Union
EV	Electric Vehicle
FDI	Foreign Direct Investment
FCAC	Forum On China-Africa Cooperation
GDP	Gross Domestic Product
IEA	International Energy Association
IRA	Inflation Reduction Act
LIP	Lithium Iron Phosphate
NZE	Net-Zero Emission
LNCAO	Lithium Nickel Cobalt Aluminum Oxide
LNMCO	Lithium Nickel Manganese Cobalt Oxide
MU	Memorandum Of Understanding
PGM	Platinum Group Metals
RBI	Resource-Based Industrialization
R&D	Research & Development
REC	Regional Economic Community
REE	Rare Earth Elements
SADC	Southern African Development Community
UK	United Kingdom
US	United States
USGS	United States Geological Survey

CHAPTER 1 – INTRODUCTION

Minerals form the bedrock of modern society, integral to nearly every aspect of daily life—from the mobile phones in our pockets to the cars we drive. They are essential components in the production of a wide array of products and technologies, driving innovation, industrialization, and the global economy. The demand for minerals, particularly critical minerals, is surging due to their importance in advancing electrification, renewable energy solutions, and high-tech applications. Critical minerals, though not universally defined, generally refer to minerals that are economically vital to a nation and pose significant risks of supply chain disruption. The ongoing global energy transition is a key driver behind the increasing demand for these minerals. Projections indicate that the need for transition minerals like lithium, cobalt, and copper could nearly quadruple by 2030 as countries strive to meet their clean energy goals.[1]

Africa is home to approximately 30% of the world's mineral reserves, with many critical to key and emerging sectors such as clean technologies.[2] It has abundant reserves of critical minerals for the energy transition: 55% of cobalt, 47.65% of manganese, 21.6% of natural graphite, 5.9% of copper, 5.6% of nickel, 1% of lithium, and 0.6% of iron ore globally.[3] This abundance of critical minerals represents a significant opportunity for economic transformation, industrial diversification, and technological advancement. However, Africa is not reaping a fair share of the profits from the global critical mineral boom.

The global race for critical minerals is intensifying, with major economies like the United States (US), European Union (EU) and United Kingdom (UK) actively developing critical mineral strategies to secure their supplies. In these strategies, Africa is often viewed primarily as a source of raw materials. This external focus underscores the urgent need for African nations to assert their interests by ensuring value addition and developing domestic supply chains.

To center Africa's development priorities in the critical mineral race, African countries must craft and implement clear, home-grown critical mineral strategies to capitalize on their mineral wealth, translating these resources into sustainable economic growth and social development for their citizens. While countries and regions such as the US, Europe, and China are heavily focused on securing critical mineral supplies, there remains a significant gap in understanding and addressing the needs of African countries to achieve growth, poverty reduction, and climate action. Bridging these gaps is essential, and platforms like the FOCAC provide an opportunity to explore the implications for Africa-China cooperation in the critical minerals sector.

This report aims to bridge existing knowledge gaps by offering a detailed analysis of critical minerals within the African context. It begins by examining Africa's definitions for these resources, mapping the continent's reserves and production capabilities and assessing existing continental and country level strategies. Next, it delves into the economic dynamics surrounding critical minerals, with a particular focus on Africa-China mining exchanges, while drawing comparisons with the EU and US. Then, the report features a case study on developing Africa's electric vehicle (EV) battery value chain and explores entry opportunities for African countries. Lastly, the report reviews the evolution of mining commitments in the FOCAC agenda, advocating for the inclusion of critical minerals as a core area of collaboration, outlining six strategic commitments designed

[1] UNCTAD (2024), 'Critical minerals boom: Global energy shift brings opportunities and risks for developing countries'.
[2] Mo Ibrahim Foundation (2022), 'Africa's critical minerals - Africa at the heart of a low-carbon future'.
[3] UNCTAD (2024), 'Unlocking Africa's critical mineral wealth: Energy transition can pave path to new prosperity'.

to strengthen Africa-China ties in the sector. The report concludes by addressing potential challenges in Africa-China critical mineral cooperation.

The report employs a mixed-method approach, combining both quantitative and qualitative research, with a primary focus on desk research. This approach enables a comprehensive analysis that highlights the opportunities associated with critical minerals. This report is primarily intended for African ambassadors in China, providing them with a detailed examination of the critical minerals landscape in Africa, along with strategic recommendations on how to effectively engage Chinese policymakers through various Africa-China cooperation platforms. The objective is to harness Chinese support in centering Africa's development priorities in the global critical mineral race, thereby fostering sustainable development and long-term economic growth across the continent. However, the report is also designed to offer valuable insights for a broader audience, including policymakers, businesses and other stakeholders interested in understanding the critical minerals sector in Africa, Africa-China mining relations, as well as the potential for enhanced cooperation in this vital area.

CHAPTER 2: AFRICA'S CRITICAL MINERALS POLICY FRAMEWORK

Understanding and defining critical minerals is a crucial first step in harnessing Africa's critical mineral resources for economic and industrial development. Globally, definitions of critical minerals vary, often focusing on their economic significance, supply chain vulnerability, and strategic importance. For Africa, a holistic definition, paired with a comprehensive strategy, is essential to create a clear roadmap for maximizing the development of these resources, ensuring they add value to African economies and benefit its citizens. This section will focus on defining critical minerals within Africa's unique context, mapping reserves and production, and reviewing existing continental and national policies on critical minerals.

2.1 Definition of Critical Minerals for Africa

There is no universal definition for the term 'critical minerals'; different countries and institutions define it based on varying criteria. It is neither fixed; its assessment reflects market and political conditions at a particular point in time and changes over time. Common criticality criteria generally include economic importance, supply chain vulnerability, and substitutability. For example, The United States defines a critical mineral as ***a nonfuel mineral or mineral material essential to the economic or national security of the U.S., which has a supply chain vulnerable to disruption, and serves an essential function in the manufacturing of a product***.[4] Similarly, the European Union defines critical raw materials (CRM) as ***raw materials of high economic importance for the EU, with a high risk of supply disruption due to their concentration of sources and lack of good, affordable substitutes***.[5] While economic importance and supply chain risk become a consensus for critical minerals among developed economies, China takes a slightly different approach, prioritizing broader economic and security needs. China uses the term 'strategic minerals' (战略性矿产), with a catalogue of 24 minerals, established in the official policy - National Mineral Resources Plan (NMRP) (2016–2020). These minerals are targeted ***for protection of national economic security, defense security, and the development needs of strategic emerging industries***.[6] They include energy[7], metallic and non-metallic minerals, and not all of these strategic minerals subject to supply risk.

For Africa, the guiding policy framework for mineral development are the Africa Mining Vision (AMV) and the African Union Commodity Strategy (AUCS). Both the AMV and the AUCS do not provide an official definition or a set list of minerals that are critical or strategic for the continent's industrial and economic transformation needs. Despite mining being a strategic sector for the continent and many African countries, the discussions on critical minerals development are still inadequate and policies and regulations are lacking.

A recent initiative to establish a continental mineral strategy is the forthcoming African Green Minerals Strategy (AGMS), with an approach paper published by The African Development Bank (AfDB) in 2023.[8] Given the surge in demand for critical minerals driven by green technologies, AGMS is designed to enhance existing mineral development policies and capitalize on the opportunities presented by the green transition. This strategy is a timely response to the global competition for critical minerals and serves as a foundational step in defining Africa's role in

[4] See specifically Division Z, 7002(a)(3) and 7002(c)(4)(A) of the Energy Act of 2020.
[5] European Council (2024), 'An EU critical raw materials act for the future of EU supply chains'. Available from https://www.consilium.europa.eu/en/infographics/critical-raw-materials/
[6] National Development and Reform Commission, PRC (2016), 'The National Mineral Resources Plan (2016-2020)'.
[7] Energy includes Oil, Natural gas, Shale gas, Coal and Coalbed methane which are not minerals, but are fossil fuels and gases.
[8] African Development Bank (2023), 'Approach Paper towards Preparation of an African Green Minerals Strategy'. Available here

developing these resources. The aim is to support global decarbonization efforts while advancing Africa's own industrialization and economic diversification.[9]

This report, based on existing African mineral strategies, taking into consideration global demand and technology advancement, **defines critical minerals for Africa as minerals that the continent has abundant reserves, which are essential to the continent's economic development, green industrialization and security.** These minerals are crucial for economic sectors including manufacturing, information technology, and especially the clean technologies and renewable energy industries. They are characterized by their necessity for these industries, potential supply chain vulnerabilities and strategic importance for economic diversification. Break down of the definition:

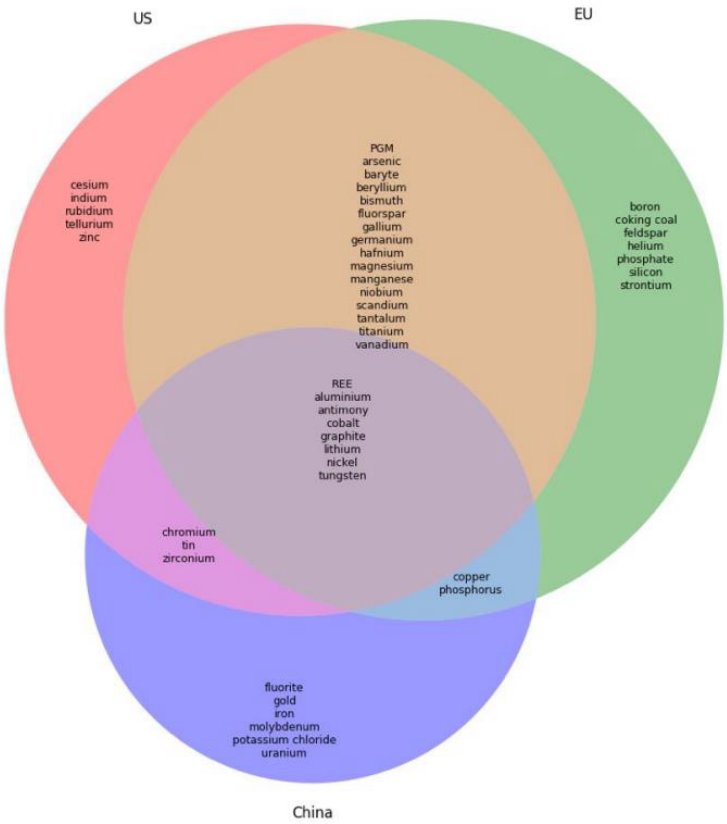
1. **Economic development**: minerals that Africa has abundant reserves, that can contribute to export revenues;
2. **Green industrialization**: minerals required for sustainable industries like renewable energy, electronic vehicles and information technologies;
3. **Security**: minerals that are crucial for defense and technological security.

2.2 List of Critical Minerals

Although with great overlaps, individual countries have developed their own lists of critical minerals based on their industrial needs and strategic assessment of supply risks. The assessment of mineral criticality changes over time as technologies, supply chain dynamics and strategic focus evolve. Therefore, the list of critical minerals is never fixed for any country or region, but requires regular update, reflecting their policy priorities, geopolitical relations and supply chain risks. The US Geological Survey (USGS) updates it every three years, with the latest list published in 2022, covering 50 minerals, from 35 commodities and groups on the previous 2018 list.[10][11] Similarly, the EU reviews its critical raw materials list every three years. Its fifth list was updated in 2023 with 34 CRMs, increasing from 30 in 2020.[12] China's modern-day recognition of critical/strategic minerals came later compared to the US and the EU. It established its official policy and catalogue of strategic minerals in November 2016 in the National Mineral Resources Plan (2016–2020), with 24 minerals identified.[13] A comparison of the critical minerals lists from the EU, US and China is provided in Figure 1.

[9] The criteria for defining the scope of minerals in the Approach Paper towards Preparation of an African Green Minerals Strategy are as follows:
[10] The 2022 list splits the rare earth elements (REE) and platinum group elements (PGM) into individual entries and therefore the number increases.
[11] US Geological Survey (2022), 'US Geological Survey Releases 2022 List of Critical Minerals'.
[12] European Commission, 'Critical raw materials'. Available here
[13] The list includes five energy goods such as oil and natural gas, which are excluded in the mineral scope. Therefore the total number of China's strategic minerals is 19.

Figure 1: Overlap and Distinction in Critical Minerals Lists: US, EU, China.



On the African continent, the Approach Paper for the African Green Minerals Strategy has published a list of 13 core green minerals and groups that are critical to the clean transition and industrial development, with a list of 19 minerals on the watch-list. The core minerals identified include aluminum, chromium, cobalt, copper, graphite, iron/steel, lithium, manganese, nickel, platinum group metals (PGMs), rare earth elements (REEs), vanadium, and zinc.[14] Notably, these minerals are also featured on the critical minerals lists of the United States, European Union, and China.

On the country level, a few mineral-rich countries have identified minerals that are strategic to their economy and the global industrial demand such as South Africa and Zambia. However, such minerals are only mentioned in policy papers or declarations and so far, lack concrete strategies regarding their extraction and supply chain development, though preparation for such strategies is underway in these countries.

[14] African Development Bank (2023), 'Approach Paper towards Preparation of an African Green Minerals Strategy'.

Table 1: List of strategic minerals by selected African countries

South Africa[15]	i. Minerals of the future / Green economy: Cobalt, Nickel, Copper, Zinc, Lead, Rare Earth Minerals ii. Steelmaking: Manganese, Iron ore iii. Energy Minerals: Coal, Uranium iv. Competitive advantage and hydrogen economy: PGMs, Chrome v. Battery minerals: Vanadium, Lithium
Zambia[16]	Copper, Cobalt, Lithium, Tin, Graphite, Coltan, Manganese, Rare earth elements, Gold, Sugilite, Emeralds, and Diamonds
D.R. Congo[17]	Cobalt, Coltan, and Germanium

Building on the Approach Paper to the African Green Mineral Strategy by the AfDB and taking into consideration Africa's industrial needs for clean technologies and information technology, and based on previous production data, core minerals, and the current demand for minerals according to lists of critical minerals published by the US, the EU, China and African nations, this report identifies the following 22 selected minerals as critical minerals for Africa. This proposed list will serve the purpose of guiding the analysis in this report.

Table 2: Proposed List of Critical Minerals for Africa

Minerals	Green technologies	Information technologies	Security technologies
Aluminum	√	√	
Chromium	√	√	
Cobalt	√	√	
Copper	√	√	
Fluorspar	√	√	
Graphite	√	√	
Lithium	√	√	
Manganese	√	√	√
Nickel	√	√	√
Niobium	√		
Platinum Group Metals (PGMs)	√	√	√

[15] Department of Mineral Resources and Energy, Government of South Africa (2022), 'The Exploration Strategy for the Mining Industry of South Africa'.
[16] Lusakatimes (September 2023), 'Cabinet Approves 2024 National Budget and Strategic Minerals Declaration'.
[17] The government of the Democratic Republic of the Congo (2018), 'Decret No.18/042'. Available here

Phosphate	√		
Rare Earth Elements (REEs)	√	√	√
Scandium	√	√	√
Silicon	√	√	
Tantalum	√	√	
Tin	√	√	
Titanium	√	√	√
Uranium	√		√
Vanadium	√	√	√
Zinc	√		
Zirconium		√	√

2.3 Mapping Critical Minerals Reserves and Production in Africa

2.3.1 AFRICAN MINING PROJECT STATUS

According to the World Bank's latest PowerMining Projects Database[18], there are 392 mining projects recorded in Africa (North Africa not included), with each project's ore reserve value assessed at more than US$250 million. By commodity type, gold mining leads in the number of projects, making up 27.6% (108 projects) of all projects, followed by PGM mining, at 12.8% (50 projects). Other ores that have over 30 projects are coal, copper and iron.

Among the 392 projects, approximately half (180 projects) are mining projects for critical minerals identified above.[19] South Africa takes the bulk of these projects (76), accounting for 42% of these critical minerals projects, followed by DRC (23), Zambia (13) and Namibia (10). By regional distribution, Southern Africa takes the lead, with a total of 116 projects, comprising 64% of these critical minerals mining projects. While Central Africa takes 34 projects and West Africa takes 20 projects, East Africa trails with 11 projects.[20]

The processing of these critical minerals remains limited. Out of 180 projects, only 74 have advanced to the refinement stage, 51 are at the intermediate processing phase, 34 have reached smelting, and the remaining projects are at the crushing stage.

[18] World Bank, 'Africa - PowerMining Projects Database'. Available here (Accessed June 2024).
[19] These projects were at various stages - from exploration and development to production, with 102 projects (56.4%) at the production stage.
[20] The dataset does not include mining projects in North Africa.

2.3.2 MAPPING AFRICA'S CRITICAL MINERALS RESERVES

At continental level, according to the latest global mineral reserve data from the US Geological Survey National Minerals Information Center, 13 critical mineral reserve estimates have been mapped across 13 African countries.[21] As illustrated in Table 4. below, South Africa and the DRC stand-out for their significant global shares in Platinum (88.73%), Cobalt (54.55%), Chromium (35.71%), and Manganese (31.58%).

Table 3: Africa's share of global critical mineral reserves

Mineral	Country	Estimated Reserves (tonnes)**	Share of Global Reserves (%)
Chromium*	South Africa	200m	35.71
Copper	DRC	80m	8.00
	Zambia	21m	2.10
Cobalt	DRC	6m	54.55
	Madagascar	100k	0.91
Fluorspar	South Africa	41m	14.64
Graphite	Madagascar	24m	8.57
	Mozambique	25m	8.93
Lithium	Zimbabwe	310k	1.11
Manganese	Gabon	61m	3.21
	Ghana	13m	0.68
	South Africa	600m	31.58
Platinum***	South Africa	63k	88.73
	Zimbabwe	1.2k	1.69
Rare Earth Elements	South Africa	790k	0.72
	Tanzania	890k	0.81
Tin	DRC	120k	2.79
Vanadium	South Africa	750k	3.95
Zinc	South Africa	6.2m	2.82
Zirconium	Kenya	18k	0.02

[21] United States Geological Survey (2024), 'Mineral Commodity Summaries 2024 World Data Files'. Available here (Accessed July 2024).

	Madagascar	2.3m	3.11
	Mozambique	1.5m	2.03
	Senegal	2.6m	3.51
	Sierra Leone	290k	0.39
	South Africa	5.6m	7.57

*shipping-grade Chromite

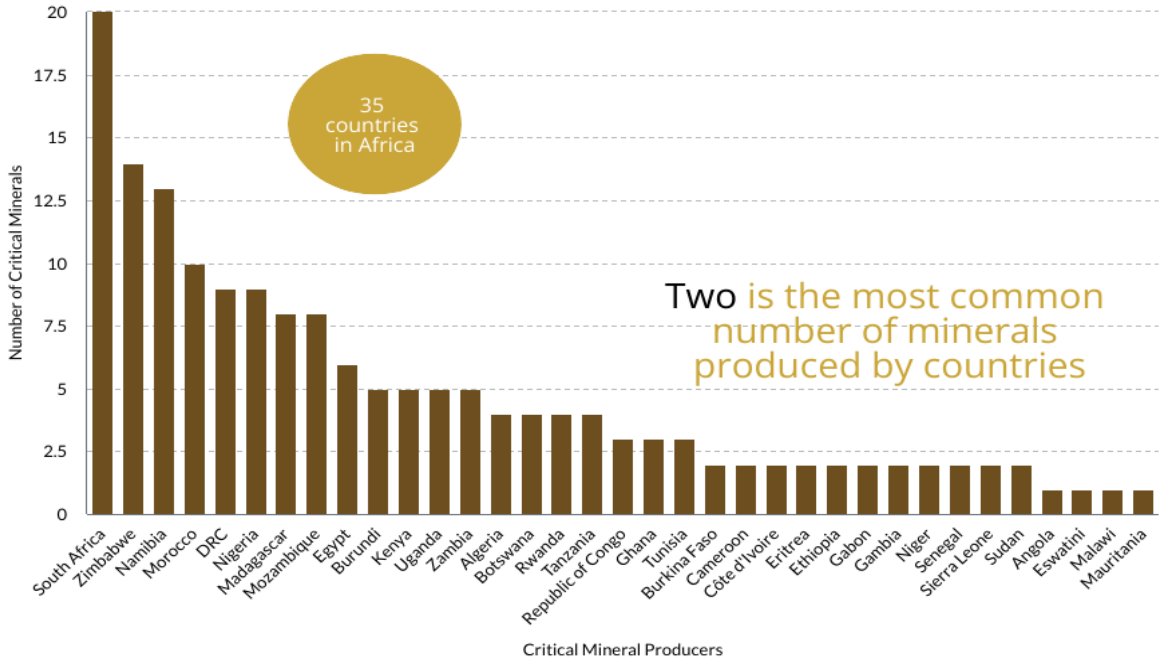
**k – thousands of tonnes; m – millions of tonnes

***includes Platinum Group Metals; volume of metal content estimated

2.3.3 MAPPING AFRICA'S CRITICAL MINERALS PRODUCTION

According to British Geological Survey data spanning the years 1970-2022, 64% (35 countries) of the continent have produced at least one type of critical minerals.[22] The critical minerals most produced in Africa are Copper (15 countries), Tin (14 countries), Manganese, Tantalum and Niobium minerals, as well as Zinc (each with 11 countries).

Figure 2: How many critical minerals have African countries produced between 1970-2022?



In terms of regional distribution, the Southern African Development Community (SADC) leads with 16 countries that have produced critical minerals between 1970-2022, closely followed by the Economic Community of West African States (ECOWAS) with 15 countries, and the Economic Community of Central African States (ECCAS) with seven countries.

[22] British Geological Survey (2024), 'World Mineral Statistics Survey'. Available here (Accessed 4 July 2024).

At a national level, countries with the most critical minerals produced are South Africa, Zimbabwe, Namibia, Morocco, and the DRC.

2.3.4 AFRICAN PROJECTED CRITICAL MINERAL LIFESPAN

As non-renewable assets, all critical minerals are finite in their supply. The urgency of each mineral's commercial or industrial supply needs fluctuates over time. Accordingly, these changes are reflected in consideration of a mineral as "critical" by different countries around the world, global mineral prices as well as in the scale and pace of mineral production and processing investments. Collectively, these factors reinforce the need for mineral value addition to be prioritized by all African countries. Maximum value must be extracted from these limited resources.

Table 4: How many more years can Africa produce critical minerals?

Mineral	Country	Estimated "life of mine" (years)
Chromium	South Africa	12
Copper	DRC	47
	Zambia	26
Cobalt	DRC	62
	Madagascar	41
Fluorspar	South Africa	129
Graphite	Madagascar	337
	Mozambique	259
Lithium	Zimbabwe	5
Manganese	Gabon	7
	Ghana	3
Platinum	South Africa	242
	Zimbabwe	39
Tin	DRC	9
Vanadium	South Africa	55
Zinc	South Africa	42
Zirconium	Madagascar	90
	Mozambique	17
	Senegal	43

	Sierra Leone	42
	South Africa	39

Although the term "life of mine" is usually applied to individual mineral deposits available for extraction, we adopt the term in the context of Africa's estimated critical mineral reserves to illustrate the role of value addition.[23] For calculation, we take each critical mineral's estimated reserves and divide this volume by each country's 2018-2022 mineral production trend data. As investment in critical mineral exploration and geological mapping increases, a country's mineral reserve estimates may also increase.[24] By extension, each critical mineral's "life of mine" may also rise, and this improves a country's opportunity to maximize the economic value of minerals through critical mineral processing.

2.4 Africa's Critical Minerals Strategies

The guiding policy framework on mineral development in Africa is the African Mining Vision adopted in 2009. The AMV advocates for a holistic approach to mineral development, emphasizing the importance of extending growth beyond extraction to foster industrialization. It promotes developing downstream sectors such as manufacturing, construction, power, and agriculture, and encourages economic diversification through value addition and knowledge linkages. The AMV aims for the transparent, equitable, and optimal exploitation of mineral resources to support broad-based sustainable growth and socio-economic development.

To coordinate and oversee the implementation of the AMV, The African Minerals Development Centre (AMDC) was established under the African Union in 2013.[25] The AMDC serves as a specialized agency dedicated to supporting sustainable mineral resource management throughout Africa. Its core activities include strengthening local capacities, enhancing governance, advancing geological and mining data management, and encouraging in-country beneficiation and value addition of minerals. Through these activities, the AMDC aims to actualize the AMV's objectives.

Complementing the AMV, the African Union Commodity Strategy, adopted in September 2021, expands the focus beyond mining. It recognizes Africa's natural resource wealth and outlines strategies to harness it for comprehensive development, in line with the African Union's Agenda 2063. The AUCS envisions commodities contributing to an integrated, prosperous, and peaceful Africa, driven by its citizens. Its four pillars provide a framework for leveraging Africa's critical minerals for sustainable development. Together, the AMV and AUCS are two continental strategies that offer a vision for transforming Africa's mineral wealth into long-term socio-economic growth.

Focusing specifically on transition minerals, the forthcoming African Green Minerals Strategy will be a crucial continental strategy for leveraging the critical minerals boom for industrialization and economic diversification in Africa. Built on four pillars—advancing mineral development, investing in human capital and technological capacity, building value chains, and promoting resource stewardship—the AGMS provides a framework for supporting green industry and establishing a

[23] MineFacts (2024), 'Life of mine and the environment'. Available here (Accessed 19 July 2024).
[24] Brimhall, G, H., Dilles, J, H., and Proffett J, M (2005), 'The Role of Geologic Mapping in Mineral Exploration'.
[25] African Union, 'African Minerals Development Centre'. Available here.

larger presence in clean-tech supply chains.[26] It will serve as a practical guide for Africa to develop a mineral-based industrialization, complementing the AMV and AUCS.

At the country level, critical minerals strategies are widely missing across African countries, even for countries with high economic reliance on minerals. Very few countries have policies and regulations related to critical minerals, although there is a growing recognition for critical minerals on the continent. In August 2024, the government of Zambia launched its critical minerals strategy which will increase the share of profits for the Zambian state in critical minerals production from future mines.[27] Similarly, South Africa also aims to launch its own Critical Minerals Strategy in 2024.[28]

While lacking a holistic critical minerals mining strategy, a number of African countries have policies and regulations on the protection of certain critical minerals. For example, the Mining Code of the Democratic Republic of the Congo (DRC), adopted in 2018, is the legal framework regarding the extraction of minerals in DRC and it contains several elements about strategic minerals. The Code defines strategic minerals as those that display a particular interest with regards to the geostrategic context and criticality, and imposes a 10% royalty on critical minerals, compared to precious metals (3.5%) and gemstones (6%).[29] Following the Mining Code, in November 2018, the DRC government issued a decree classifying cobalt, coltan, and germanium as strategic minerals.[30] The last three years (2022-2024) also witnessed a surge of African countries, such as Ghana and Nigeria, imposing export restrictions on unprocessed critical minerals (see Table 3). However, considering 35 African countries have produced at least one type of critical minerals, this list of countries with critical minerals-related policies is rather short.

Table 5: Country-level Policy Summary

Countries	Policies related to critical minerals	Year
Democratic Republic of the Congo	10% royalty on strategic minerals	2018
Angola	Stringent authorization required for trading strategic minerals[31][32]	2011
Nigeria	Export ban on raw solid minerals[33]	2023
Namibia	Export ban on unprocessed critical minerals such as unprocessed crushed lithium ore, cobalt, manganese, graphite and rare-earth minerals[34]	2023
Zimbabwe	Export ban on raw lithium ores[35]	2022

[26] Project Syndicate (September 2023), 'Making the Most of Africa's Strategic Green Minerals'.
[27] Bloomberg (2024), 'Zambia plans state firm to own 30% of critical minerals mines'.
[28] Andrea Cabanac (February 2024), 'Key takeaways: Opening address by the Minister of Mineral Resources & Energy'. Available here
[29] International Energy Agency (2022), 'Mining Code of the Democratic Republic of Congo'. Available here
[30] The government of the Democratic Republic of the Congo (2018), 'Decret No.18/042'. Available here
[31] In Angola's Mining Code 2011, gold, diamonds and radio-active minerals are designated as strategic minerals
[32] Clifford Chance (2011), 'New Angolan Mining Code'. Available here
[33] Bloomberg (2023), 'Nigeria Seeks to Tighten Rules to Curb Raw Mineral Exports'.
[34] The Namibian (2023), 'Namibia bans export of unprocessed lithium'.
[35] Reuters (2022), 'Zimbabwe bans raw lithium exports to curb artisanal mining'.

Ghana	Export ban on unprocessed bauxite and iron ore*[36]	2023
Uganda	Export ban on unprocessed iron ore and other minerals[37]	2015
Tanzania	Export ban on raw lithium[38]	2024
Zambia	State-owned company to control at least 30% of critical minerals production from future mines[39] At least 35% of local procurement	2024

[36] Ministry of Lands and Natural Resources, Ghana (2023), 'Ghana to stop exporting raw minerals'. Available here
[37] African Mining Market (2023), 'Uganda maintains ban on export of raw minerals'.
[38] The Africa Report (2023), 'Exclusive: Tanzania to ban unrefined lithium exports from May 2024'.
[39] Bloomberg (2024), 'Zambia plans state firm to own 30% of critical minerals mines'.

CHAPTER 3: CRITICAL MINERALS IN AFRICA'S ECONOMY AND CHINA'S ROLE

Africa's abundant natural resources form the backbone of its economy, with the mining sector playing a crucial role in generating export revenue, employment, and growth. Foreign investment, particularly from global powers, significantly shapes this sector. The United States, Australia, Canada, the UK, and China are the largest non-African countries with significant mine ownership across the continent. Mining is also central to Africa's economic relations with China, the US, and the EU, as it constitutes a major share of Foreign Direct Investment (FDI) and dominates trade exchanges. This chapter will first offer an overview of the economic importance of mining to Africa, and then delve into Africa's mining relationships, focusing on China's presence, and compare this with Africa's engagements with the US and Europe.

3.1 The Economic Significance of Critical Minerals for Africa

Mining is an important economic sector for the African continent. In terms of exports, minerals and fossil fuels accounted for over a third of exports for at least 60% of African countries in 2019.[40] Approximately half of the continent – 24 countries are greatly dependent on mining, with minerals taking up over 75% of total export earnings.[41] For instance, between 2013 and 2017, minerals and metals made up to 92% of Botswana's total merchandise exports and 81% of DRC's total merchandise exports.

Beyond export revenues, minerals significantly contribute to the gross domestic product (GDP) of African countries. According to a 2017 estimate by the AfDB, minerals contributed approximately 28% to the continent's GDP.[42] The 24 mining-dependent countries, in particular, derive at least 6% of their GDP from mining activities (see Table 6).

Table 6: contribution of mining activities to GDP by 24 mining-dependent countries

Contribution of mining to GDP	Countries
40% to 50%	Republic of the Congo and Libya
30% to 40%	DRC and Angola
20% to 30%	Equatorial Guinea, Algeria, Mauritania, and Gabon
10% to 20%	Zambia, Botswana, Guinea, Mozambique, and Zimbabwe
6% to 10%	Sudan, Namibia, Eritrea, Egypt, South Sudan, South Africa, Ghana, Chad, Niger, Liberia, and Côte d'Ivoire

[40] International Energy Agency (2019), 'Africa Energy Outlook 2019', Available here.

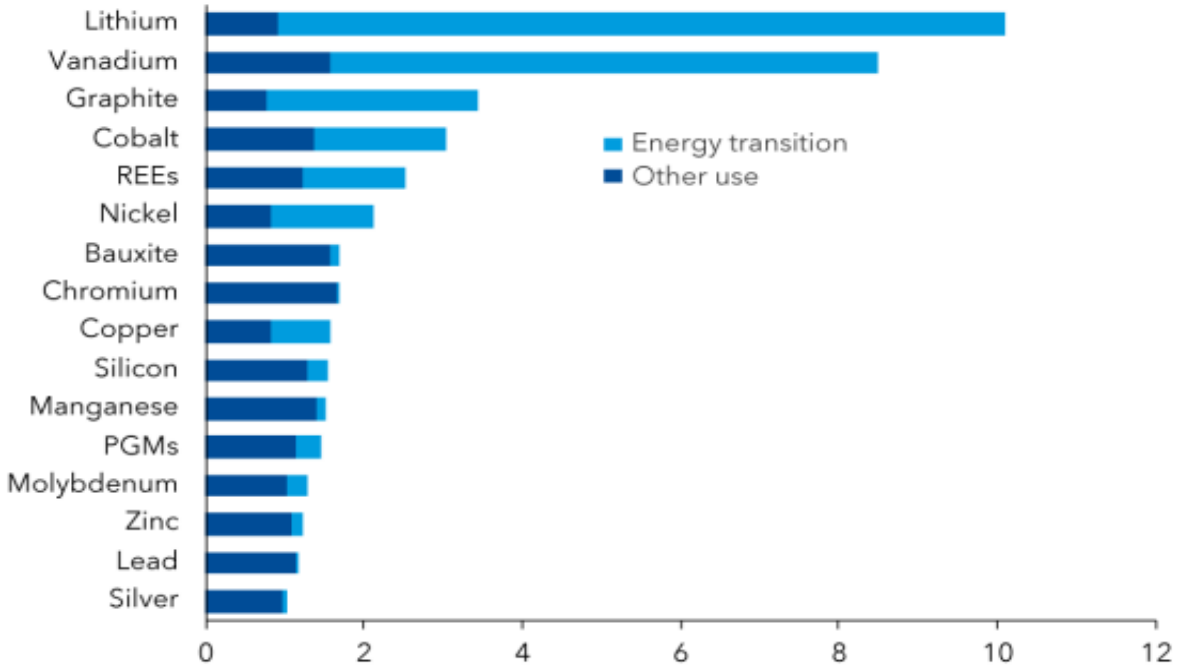
[41] Aixiang Wu, Hongwei Chen, Bing Wang, '世界矿业发展报告 2022-2023 (World Mining Development Report 2022-2023)', Social Sciences Academic Press, Beijing, 2023.

[42] African Natural Resources Center (2016), 'Catalyzing Growth and Development through Effective Natural Resources Management', Available here.

In addition, mining is also a major source of employment in mining-dependent countries by creating direct, indirect and induced employment.[43] In nine African economies, the mining sector accounts for over one percent of total direct employment.[44] Additionally, the informal sector—especially artisanal and small-scale mining (ASM)—employs a significant portion of the population. For instance, artisanal gold mining in Burkina Faso employs approximately 700,000 people, far surpassing the 7,000 employed by formal mining companies.[45] However, while mining generates employment opportunities, its level of employment is generally low compared to other sectors. Moreover, it often offers limited opportunities for skill development, posing a challenge to broader economic diversification.[46]

The significance of mining to African countries continues to grow. Mining production was estimated to increase by 19.1% in 2022.[47] This growth is partly fueled by the global contest for critical minerals, particularly those essential for clean energy transition, communication technologies, and security. According to the International Energy Agency (IEA)'s World Energy Outlook 2022, the demand for critical minerals for clean technologies is projected to double by 2030 and quadruple by 2050 at annual revenues reaching US$400 billion.[48] Figure 3 illustrates the demand growth for key critical minerals.

Figure 3: Ratio of demand growth for selected critical minerals by 2050.



Source: IMF (2024), 'Harnessing Sub-Saharan Africa's Critical Mineral Wealth'

[43] Direct employment refers to workers employed by the companies that own and operate the extraction sites. Indirect employment includes workers employed by companies that supply goods or services to the mining companies or use their services. Induced employment is the additional jobs created from the spending activities of those directly and indirectly employed by the mining industry.
[44] Intergovernmental Forum on Mining, Minierals, Metals and Sustainable Development (2018), 'Local Content Policies in the Mining Sector; Stimulating Direct Local Employment'. Available here.
[45] The Nordic Africa Institute (2024), 'Africa's Mineral Economies Breaking their Dependence on Mining'. Available here.
[46] Federation of Indian Mineral Industries (2019), 'Employment in Mining: A case of missed opportunity'. Available here.
[47] International Organizing Committee for the World Mining Congresses, 'World Mining Data 2024'. Available here.
[48] International Energy Agency (2022), 'World Energy Outlook 2022'. Available here.

Despite Africa's vast mineral reserves, the continent accounted for just 4.9% of global mineral production in 2022, the lowest among all continents.[49] Furthermore, Africa's mining sector remains concentrated on upstream activities—extracting and exporting raw materials—capturing minimal value in the supply chain. For instance, cobalt is a critical component in rechargeable batteries for EVs. While the processed cobalt hydroxide had a unit value of US$20.2 in 2022, the cobalt ore was only traded at US$6.28 per unit.[50] Though DRC produces 70% of global cobalt, it has not captured the majority of the mineral's economic value.

As demand for critical minerals continues to surge, African countries have significant opportunities to boost their economic benefits by focusing on value addition and expanding processing capacities. Estimates indicate that increasing value-added activities could yield between US$200 million and US$2 billion in additional annual revenue by 2030, while potentially creating up to 3.8 million jobs.[51] And critical minerals play a central role in achieving the goal. To fully capitalize on these opportunities, it is crucial to enhance strategies, incentives, and policies that attract investment in downstream industries and foster value addition to critical minerals.

3.2 Africa-China Mining Cooperation

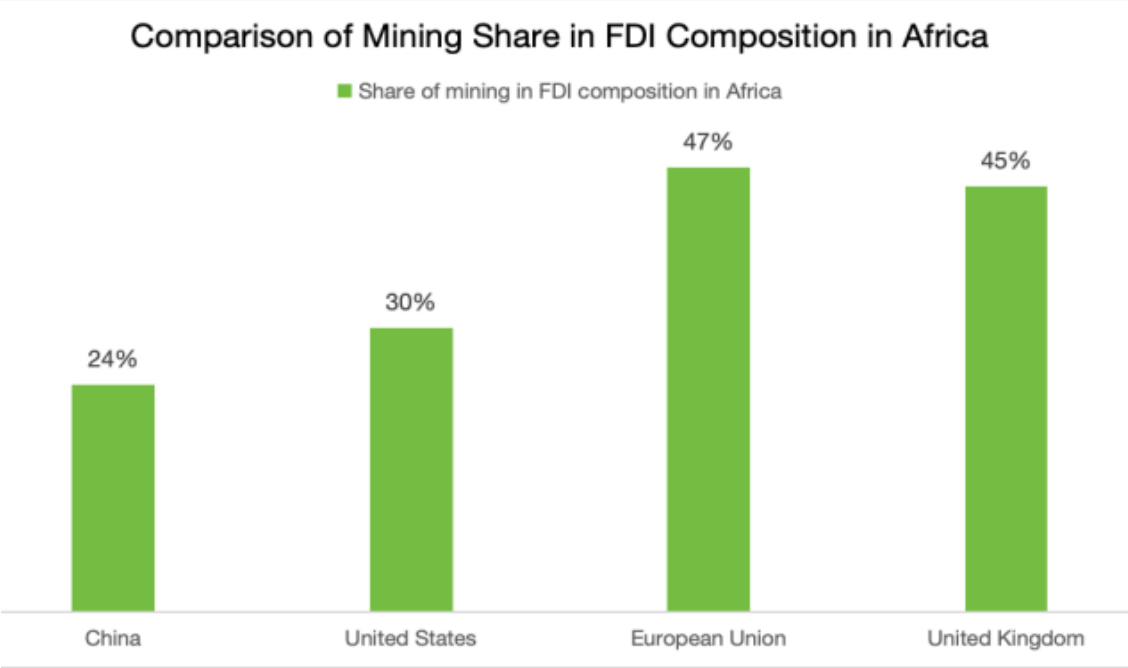
Chinese mining activities in Africa date back to the late 1980s and early 1990s, driven by China's burgeoning domestic demand then for key industrial minerals such as copper, iron, manganese, and chromium.[52] One of the early notable projects was ASA Metals, a joint venture established in 1996 between Sinosteel, holding a 60% share, and the South Africa Limpopo Province Development Corporation, with a 40% share. This venture invested in a chrome ore mine and a smelting plant to produce ferrochrome, an essential material for stainless steel production.[53]

Since the 1990s, Chinese investment in Africa's mining sector has steadily increased, with Chinese FDI stock in mining reaching its peak in 2019 (see figure 4). As of now, Chinese FDI in African mining stands at US$9.76 billion, making it the second-largest destination for Chinese FDI on the continent, representing 23.8% of the total, surpassed only by the construction sector.[54] In comparison, mining represents an even larger share of U.S. and European FDI in Africa. According to a USDA study, American FDI in African mining peaked at 70% in 2002, though it has since declined to about 30% by 2020.[55] For the EU, 47% of its FDI in Africa is directed toward mining (compared to 7% of total EU FDI to all destinations), while 45% of the UK's FDI stock in Africa is concentrated in the mining sector (see Figure 5).[56]

[49] International Organizing Committee for the World Mining Congresses, 'World Mining Data 2024'. Available here.
[50] UNCTAD (2023), 'Technical Note on Critical Minerals - Supply chains, Trade Flows and Value Addition'. Available here.
[51] McKinsey&Company (2021), 'Africa's Green Manufacturing Crossroads: Choices for a Low-carbon Industial Future'. Available here.
[52] China International Contractors Association, '中国与非洲矿业工程合作大有可为'. Accessed at https://www.chinca.org/cica/info/18032714355611
[53] Ibid.
[54] MOFCOM, '2022 Statistical Bulletin of China's Outward Foreign Direct Investment'.
[55] Economic Research Service, U.S. Department of Agriculture (2022), 'Foreign Direct Investment in Africa: Recent Trends Leading up to the African Continental Free Trade Area (AfCFTA)'.
[56] David Luke (2023), 'The key to better trade with Africa after Brexit', Available here.

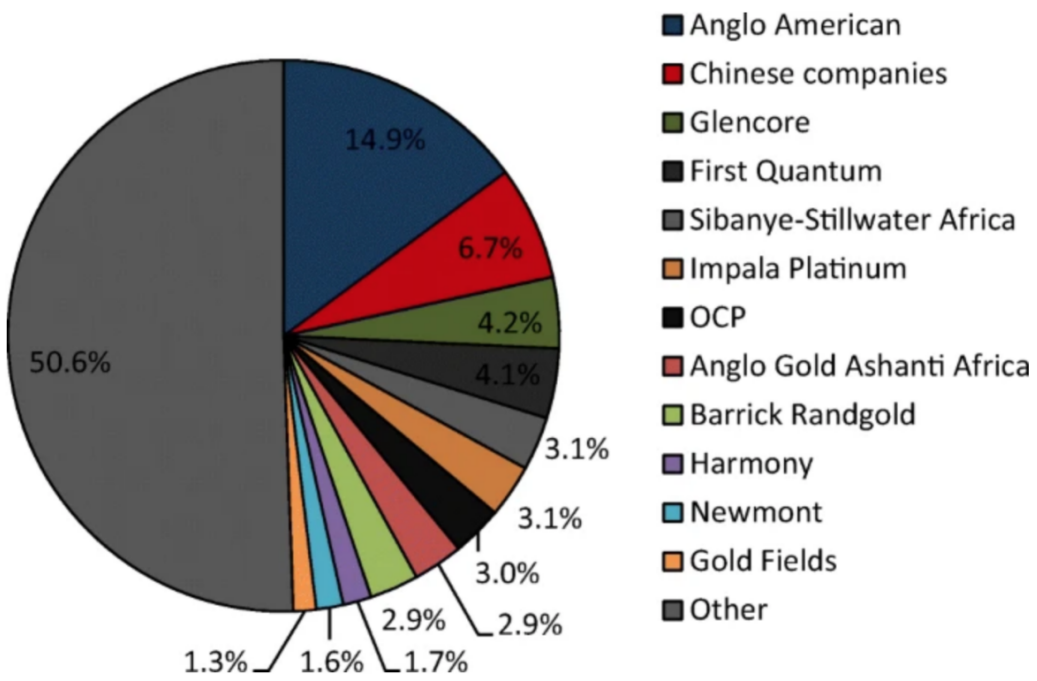
Figure 4: Chinese end-of-year FDI stock to Africa in the mining sector

Figure 5: Comparison of Mining Share in FDI Composition in Africa



Compared to their Western counterparts, Chinese firms are relatively late entrants to the global mining industry, including in Africa. However, media attention on China's recent expansion and engagement often leads to an overestimation of its involvement. A study revealed that Chinese companies collectively accounted for 6.7% of Africa's mine production in 2018, while the British mining giant Anglo-American PLC alone represented more than double that share (see Figure 6).[57] Current estimates suggest that China's share has increased to around 8%.[58]

Figure 6: Corporate Control over Total African Mining Production in 2018



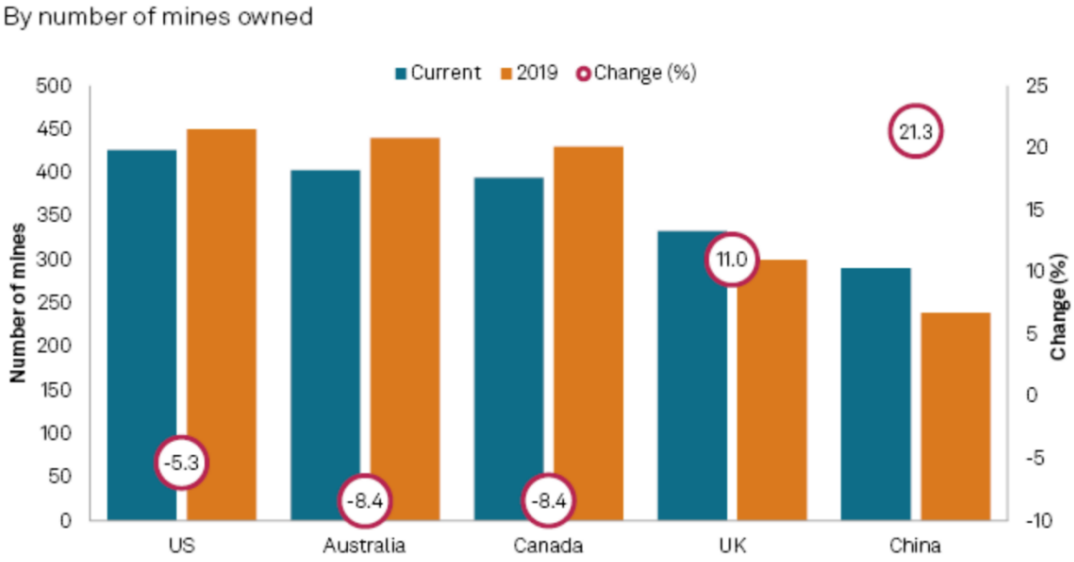
Source: Ericsson, M., Löf, O. & Löf, A. Chinese control over African and global mining—past, present and future. Miner Econ 33, 153–181 (2020).

In terms of mine ownership in Africa, China is ranked fifth, behind the United States, Australia, Canada and the United Kingdom, according to S&P Global.[59] However, China has been rapidly expanding its presence in Africa. Since 2019, the number of Chinese-owned mines has increased by 21.3%, and UK-owned mines by 11%, while the US, Australia, and Canada have seen a decline in the number of mines they control over the last five years (see Figure 7).[60]

[57] Ericsson, M., Löf, O. & Löf, A (2020), 'Chinese control over African and global mining—past, present and future', Miner Econ 33, 153–181.
[58] Wilson Center, "Examining China's Impact on Mining in Africa: Critiques and Credible Responses". https://www.wilsoncenter.org/blog-post/examining-chinas-impact-mining-africa-critiques-and-credible-responses
[59] S&P Global (2024), 'China, UK expand mining presence in Africa; US, Canada, Australia lose ground'. Available here.
[60] Ibid.

.

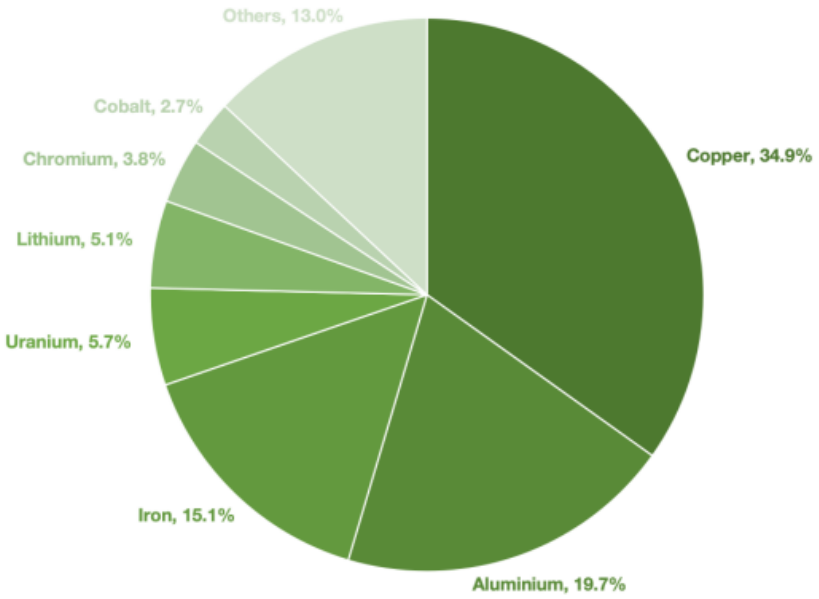
Figure 7: Largest non-African countries owning mines in Africa



Source: S&P Global Market Intelligence

Chinese investment in Africa's mining sector is also heavily concentrated in specific minerals, with copper attracting the most interest. According to a report published by Boston University, between 2000 to 2022, over a third (34.9%) of Chinese FDI for non-energy mining and processing in Africa went to the copper sector, followed by investment in aluminum (19.7%), iron (15.1%), uranium and lithium (see Figure 8).[61]

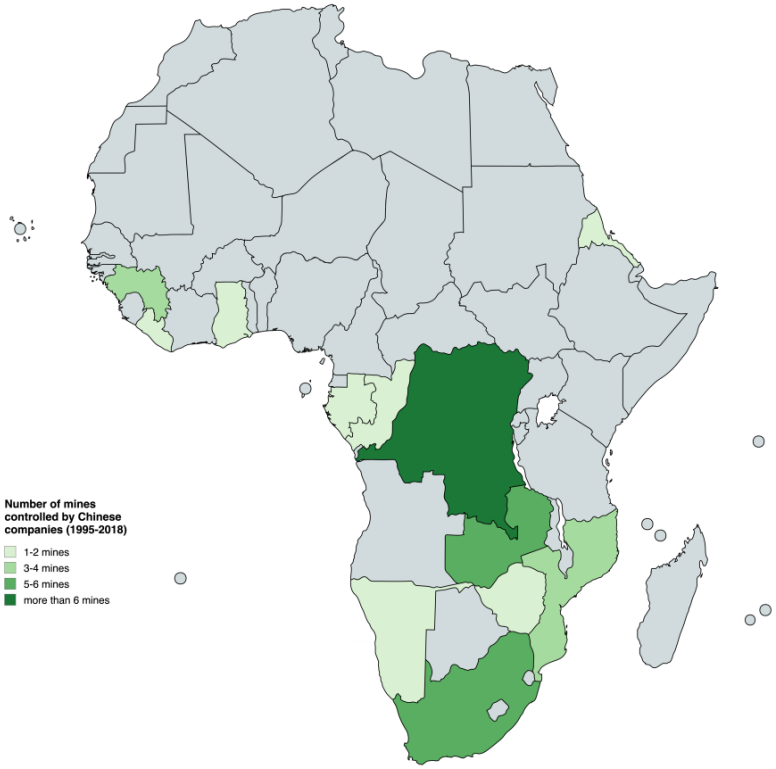
Figure 8: Chinese FDI for non-energy mining and processing in Africa by mineral (2000-2022)



[61] Moses, Oyintarelado, Dianah Ngui, Lucas Engel and Abbi Kedir. 2024. "China-Africa Economic Bulletin, 2024 Edition." Boston University Global Development Policy Center and African Economic Research Consortium.

China's mineral interests, coupled with differing levels of openness and regulatory conditions in host countries, have resulted in considerable variation in the distribution of Chinese mining investments across Africa. As shown in Figure 9, most Chinese investment in 2018 was concentrated in Southern Africa, with the Democratic Republic of Congo, South Africa, and Zambia leading as key destinations for Chinese-controlled mines. Since 2020, Zimbabwe has also emerged as a significant hub, due to heavy Chinese investment in the lithium mining.

Figure 9: Number of Mines Controlled by Chinese Companies



Source: Ericsson, M., Löf, O. & Löf, A. Chinese control over African and global mining—past, present and future. Miner Econ 33, 153–181 (2020).

Beyond investment, Chinese imports from Africa are predominantly mineral fuels and minerals. In the last five years (2019-2023), China's total imports from Africa amounted to US$502.13 billion, with about half of these imports comprising minerals.[62] According to data retrieved from UN COMTRADE, mineral fuels, mainly crude petroleum oils, were the largest export category from Africa to China, followed by ores, precious stones and metals, copper, and other base metals (see Table 7). Table x provides a detailed look at the top 20 mineral products exported from Africa to China between 2019 and 2023. Copper, both refined and unrefined, tops the list of mineral exports from Africa to China, followed by iron, gold, manganese, aluminum, and platinum group metals. It is worth noting that the majority of African mineral exports to China are unrefined.

[62] UN COMTRADE.

Table 7: Top 5 African Exports to China (2019-2023)

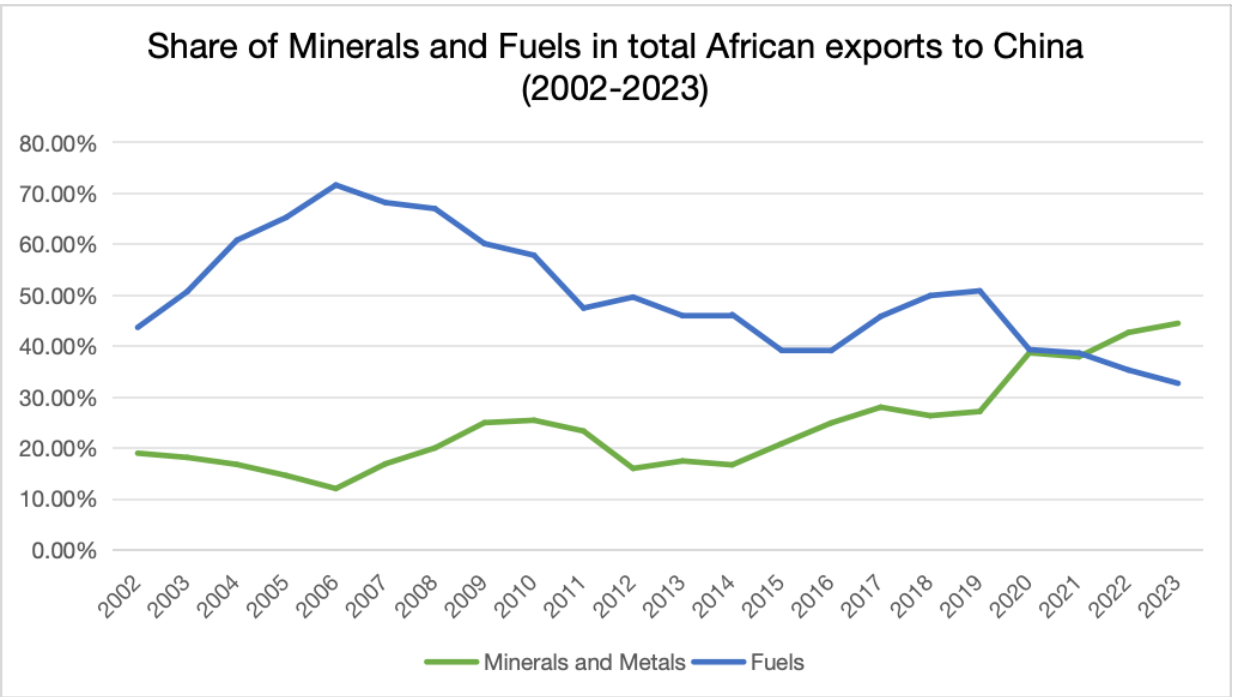
Category	Share of total export
Mineral Fuels, Mineral Oils and Products Of Their Distillation	39.03%
Ores, slag and ash	21.23%
Precious or semi-precious stones, precious metals, pearls	13.61%
Copper and articles thereof	11.20%
Other Base Metals; Cermets; Articles Thereof	3.35%

Table 8: Top Minerals and Mineral Articles that Africa exported to China (2019-2023)

Mineral Category (Top 1 - 8)	Share of total export	Mineral Category (Top 8 - 16)	Share of total export
Iron ores and concentrates	6.45%	Copper ores and concentrates	1.88%
Refined copper and copper alloys, unwrought	5.88%	Niobium (columbium), tantalum, vanadium or zirconium ores and concentrates	0.65%
Unrefined copper; copper anodes for electrolytic refining	5.08%	Zinc ores and concentrates	0.64%
Manganese ores and concentrates	3.76%	Titanium ores and concentrates	0.63%
Aluminium ores and concentrates	3.72%	Uranium, thorium and their compounds	0.47%
Platinum Group Metals	3.66%	Nickel ores and concentrates	0.26%
Cobalt mattes and other intermediate products of cobalt metallurgy	3.35%	Unwrought aluminum	0.12%
Chromium ores and concentrates	2.61%	Cobalt ores and concentrates	0.11%

Trade data from the past two decades also reveals a notable shift in Africa's export composition to China, moving away from mineral fuels toward minerals and metals. Figure 10 shows that the share of minerals and metals in Africa's total exports to China increased from about 20% in 2002 to 45% in 2023.[63] Meanwhile, African exports of mineral fuels, which peaked at 70% in 2006, have steadily declined to 33% by 2023.[64] This trend underscores the growing importance that minerals play in China-Africa economic exchanges.

Figure 10: Share of Minerals and Fuels in total African exports to China (2002-2023)



Minerals and metals combined account for about 80% of African exports to China. In contrast, Africa's exports to the US and EU are more diversified compared to those to China. Mineral fuels remain the largest export category to both regions, accounting for an average of 31.6% of Africa's total exports to the EU and 22.5% to the US between 2019 and 2023.[65] Exports of minerals and metals from Africa to these markets have remained relatively stable, averaging around 10% for the EU and 12% for the US over the past five years. Apart from fuels and minerals, both the EU and the US import a broader range of goods from Africa compared to China, including manufactured products such as vehicles, electrical machinery and apparel (see Table 9), while Chinese imports from Africa are dominantly raw materials.

[63] UN COMTRADE, HS code 25-26 & 72-83.
[64] UN COMTRADE, HS code 27.
[65] UN COMTRADE, HS code 27. The average excludes 2022 and 2023 which are outliers.

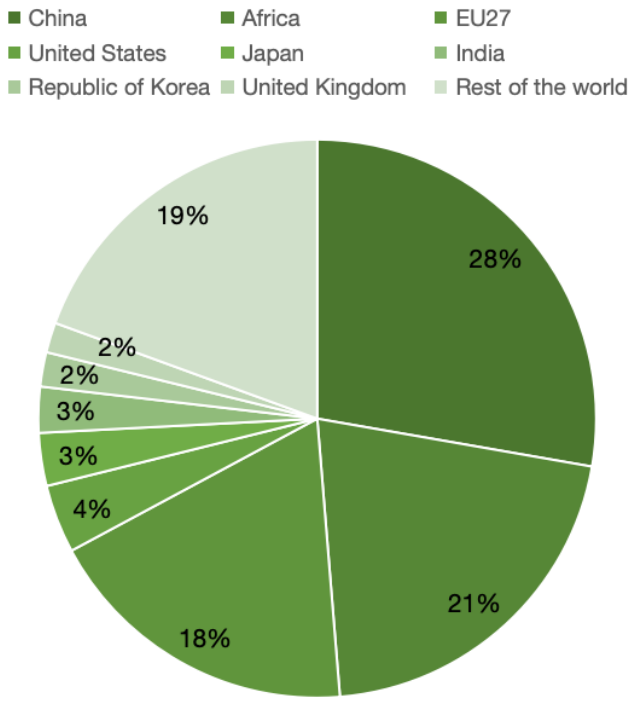
Table 9: Comparison of top 5 African export categories to China, EU and US in 2023

China		EU		US	
Category	**Share in total export**	**Category**	**Share in total export**	**Category**	**Share in total export**
Ores, slag and ash	44.01%	Mineral fuels	30.87%	Mineral fuels	27.29%
Mineral fuels	14.23%	Vehicles	13.38%	Pearls, precious or semi-precious stones, precious metals, metals clad with preciousmetal and articles thereof; imitation jewellery; coin	16.81%
Copper and its articles	12.11%	Electrical machinery and equipment and parts	7.16%	Vehicles	7.36%
Iron and steel	8.18%	Pearls, precious or semi-precious stones, preciousmetals, metals clad with precious metal and articles thereof; immitation jewellery; coin	4.86%	Articles of apparel and clothing accessories, not knitted or crocheted	5.40%
Salt; sulfur; earths and stone; plastering materials, lime and cement	3.88%	edible fruit, nuts, and the peel of citrus fruit or melons	4.15%	Articles of apparel and clothing accessories, knitted or crocheted	3.55%

In absolute terms, China is currently the biggest market for African minerals and metals, at a value of US$16.0 billion in 2023, followed by the African continent itself (US$12.1 billion), the EU (US$10.6 billion), the US (US$2.3 billion) and Japan (US$1.8 billion) (see Figure 11).[66]

[66] UN CONTRADE, HS code 25-26 for minerals and 72-83 for metals.

Figure 11: African exports of minerals and metals by country



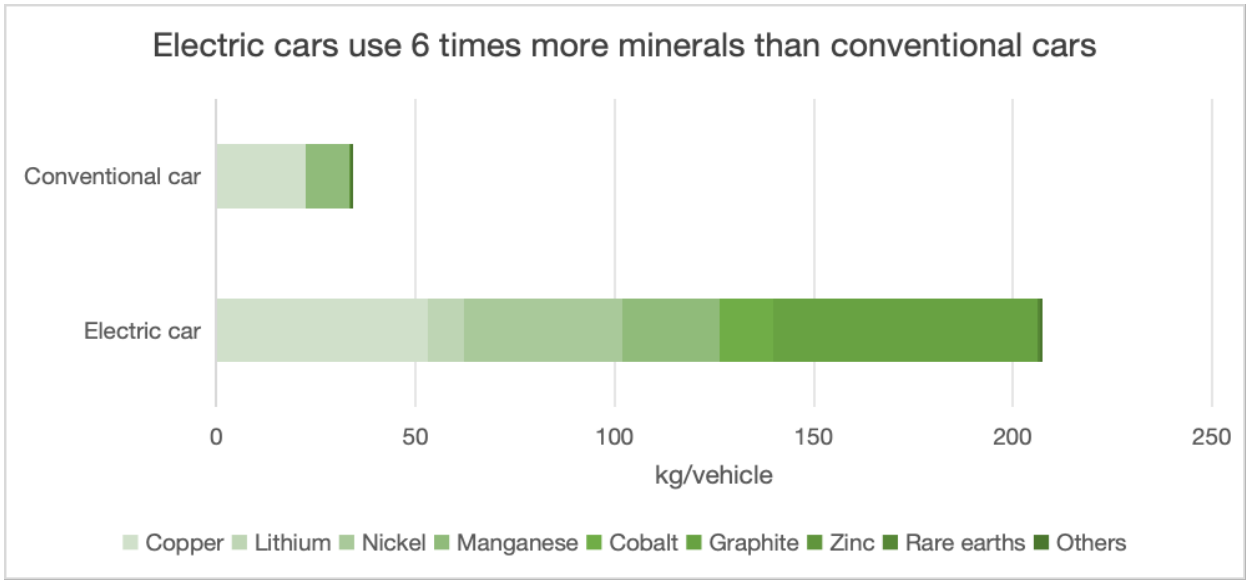
In conclusion, the mining sector is a key pillar of China-Africa economic relations, with a focus on critical minerals like copper and aluminum. While China's mining output in Africa is still smaller than that of Western countries like the UK and the US, its mine ownership has expanded more rapidly in the last 5 years, surpassing other global powers. Trade dynamics further highlight China's growing interest in Africa's mining sector, as Africa's exports to China have transitioned to a higher concentration of minerals and metals. In contrast, African exports to the U.S. and EU remain more diversified, with these regions importing both raw materials and manufactured goods.

CHAPTER 4: CASE STUDY ON EV BATTERY VALUE CHAIN

Batteries are emerging as a crucial component in the global clean energy transition, primarily due to their role in powering EV and balancing power grids. The global shift towards clean technologies has led to rapid growth in the EV industry and an increasing need for renewable energy storage solutions. According to the IEA, EV sales are projected to increase more than fivefold in the Stated Policies Scenario (STEPS) and eightfold in the Net Zero Emissions (NZE) Scenario by 2050.[67][68] In the NZE scenario, the sales share of EVs is expected to rise from 18% today to 65% by 2030, significantly boosting demand for batteries. Additionally, demand for battery storage and electric trucks is projected to rise substantially as well. To meet this growing demand, battery production is anticipated to increase fivefold by 2030 and fourteenfold by 2050.[69]

A key characteristic of lithium batteries is their cathode chemistry, which dictates both performance and material requirements. For EVs, three primary categories of cathode chemistry are most relevant today: lithium nickel manganese cobalt oxide (NMC), lithium nickel cobalt aluminum oxide (NCA), and lithium iron phosphate (LFP). NMC and NCA cathodes, known for their higher energy density, dominate the EV battery market globally, especially outside of China. In contrast, LFP cathodes, while having lower energy density, are more cost-effective and do not use nickel and cobalt, and are more popular in China. This section focuses on NMC batteries due to their global prevalence and Africa's abundance of the necessary raw materials. However, LFP presents a particular opportunity in Morocco where the key material phosphate is abundant. According to IEA, an EV equipped with a 75 kWh battery pack using an NMC 622 cathode and a graphite-based anode requires six times more minerals than conventional cars (see Figure 12).

Figure 12: Amount of minerals used in electric cars compared to conventional cars

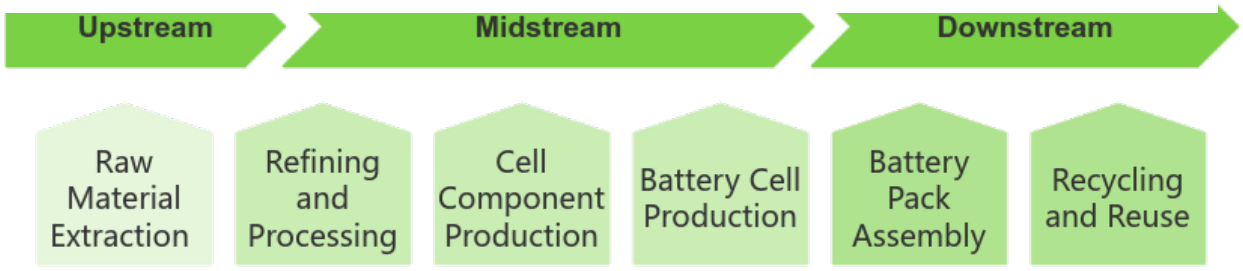


The EV battery supply chains involve a multifaceted process with six intricate stages. It begins with raw materials extraction and refining, then processed materials are used to manufacture cell

[67] The Stated Policies Scenario (STEPS) is a scenario that reflects today's policy settings. The STEPS is associated with a temperature rise of 2.4 °C in 2100 (with a 50% probability). The Net Zero Emissions (NZE) is a scenario that limits global warming to 1.5 °C by 2050.
[68] International Energy Agency, 'Global Critical Minerals Outlook 2024'.
[69] International Energy Agency, 'Global Critical Minerals Outlook 2024'.

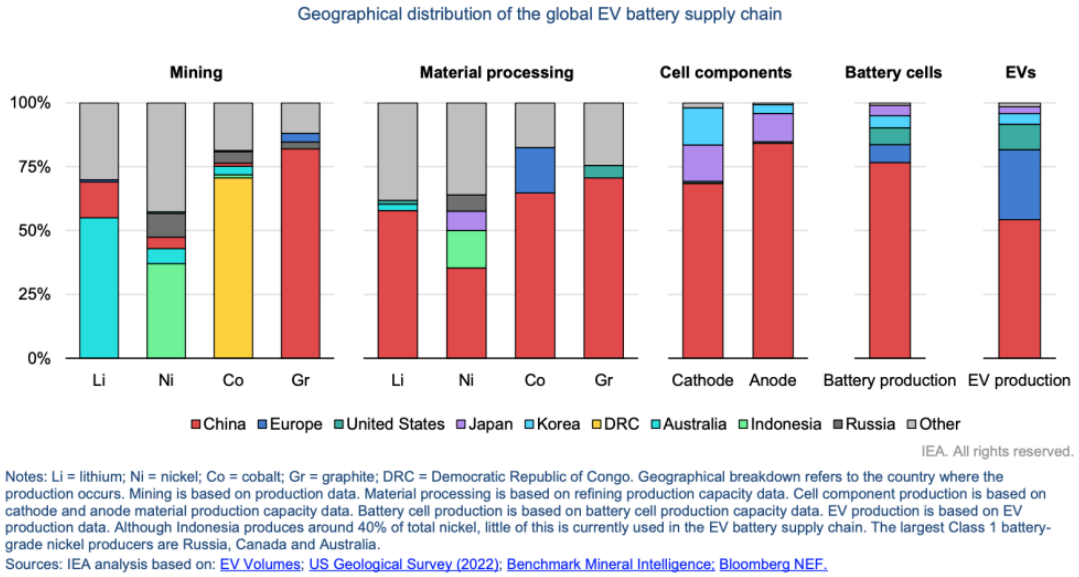
components and battery cells, and finally, the cells are assembled into modules, which are recycled at the end of the battery's life cycle (see Figure 13).

Figure 13: EV battery supply chain



Throughout the supply chain, geographical concentration increases (see Figure 14), with China dominating the mid- and down-stream stages.[70] In mining, Australia leads in lithium production, Indonesia in nickel, DRC in cobalt, and China in graphite. During material processing, China dominates, handling more than half of the processing for lithium, cobalt, and graphite, and about 35% for nickel. In cell production, China manufactures three-quarters of all lithium-ion batteries and accounts for 70% of cathode production capacity and 85% of anode production capacity. At the final EV assembly stage, China produces over half of the world's EVs, Europe contributes more than a quarter, and the United States, South Korea, and Japan follow.

Figure 14: China dominates the mid- and down-steam EV battery supply chain



Source: IEA, Global Supply Chains of EV Batteries

[70] IEA, 'Global Supply Chains of EV Batteries'.

Africa holds approximately 5% of the world's natural lithium ore reserves. The DR Congo leads with the largest share, accounting for 3.4%, while Zimbabwe, Namibia, Nigeria, Ghana, and Mali collectively contribute around 1.6%.[71] Ongoing exploration projects in Angola, Rwanda, and Ethiopia have the potential to further increase the continent's lithium reserves. Zimbabwe is currently Africa's leading lithium producer, ranking 6th globally and supplying approximately 1.8% of the world's lithium raw materials.[72] The supply is growing rapidly, with Africa's mined lithium output set to triple in 2024 compared to 2023 and potentially reach 12% of global output by 2030.[73]

China plays a significant role as a major investor in Africa's rapid lithium mining expansion. In Zimbabwe alone, Chinese companies invested over US$1 billion in acquiring lithium projects in 2021 and 2022.[74] Benchmark Mineral Intelligence estimates that more than 90% of Africa's forecasted lithium supply this decade will come from projects at least partly owned by Chinese firms.[75] Annex X provides a list of announced lithium projects in Africa with Chinese investment.

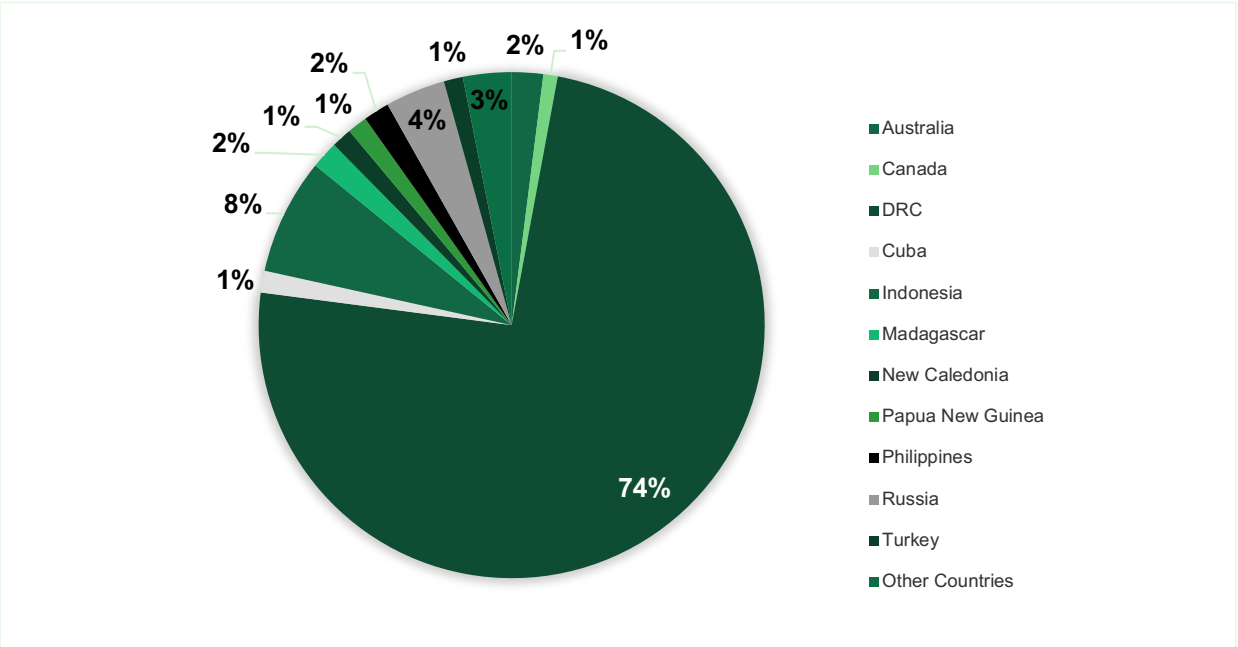
However, investment in extraction alone cannot realize Africa's economic aspirations. To fully benefit from the clean energy transition and the critical minerals rush, African countries like Zimbabwe, Tanzania, Ghana and Namibia have implemented bans on raw lithium exports. In response, Chinese investors have established at least four concentrate plants in Zimbabwe to separate lithium content from the solid rock. Furthermore, the Zimbabwean government is advocating for the establishment of lithium refining facilities within the country.[76]

Cobalt is another critical mineral extensively utilized in the EV industry. Cobalt is integral to the stability and energy density of lithium-ion batteries, which accounted for 73% of overall cobalt demand in 2023.[77] The rapid increase in EV sales has precipitated a substantial rise in cobalt production. However, compared to lithium and nickel, the growth in demand for cobalt is slower due to the trend towards low-cobalt or cobalt-free batteries and the development of alternatives to lithium-ion batteries, particularly sodium-ion batteries.

In the upstream of the cobalt value chain, DRC dominates, accounting for 74% of global cobalt production, followed by Indonesia and Russia (see Figure 15). The midstream stage - refining is particularly important for cobalt production as, unlike lithium, cobalt is primarily produced as a by-product of copper or nickel extraction. Refined cobalt production is highly geographically concentrated. In 2023, China accounted for over 75% of the global refined cobalt supply, while Finland and Japan contributed 9% and 3%, respectively.[78] In the downstream market, China, the UK, France, Canada, and the US represent the major share.

[71] The Payne Institute for Public Policy, 'Can African countries benefit from the coming boom in battery minerals demand?' https://repository.mines.edu/bitstream/handle/11124/14317/Payne-Institute-Commentary-Can-Africa-Benefit-from-the-Battery-Minerals-Boom.pdf?sequence=1&isAllowed=y
[72] Nasdaq, 'Top 9 Lithium-producing Countries (Updated 2024)'. https://www.nasdaq.com/articles/top-9-lithium-producing-countries-updated-2024
[73] Benchmarksource, 'Africa's critical mineral production poised for rapid growth'. https://source.benchmarkminerals.com/article/africas-critical-mineral-production-poised-for-rapid-growth
[74] Reuters, 'China's Huayou commissions $300 million Zimbabwe lithium plant'. https://www.reuters.com/markets/commodities/chinas-huayou-commissions-300-mln-zimbabwe-lithium-plant-2023-07-05/
[75] The Economist, 'China is winning Africa's "white-gold" rush for lithium'. https://www.economist.com/middle-east-and-africa/2023/11/09/china-is-winning-africas-white-gold-rush-for-lithium
[76] Reuters (2024), 'Zimbabwe lithium miners table refinery plans under govt pressure'.
[77] Cobalt Institute (2023), 'Cobalt Market Report 2023'. Available here.
[78] Ibid.

Figure 15: World Cobalt Mine Production by 2023



Africa plays a central role in the global cobalt supply chain. Madagascar, Morocco, South Africa, Zambia, DRC hold more than 60% of the global cobalt reserves, and DRC alone enjoys 57% of the global reserve. While most of the world's cobalt is located and produced in DRC, it is estimated that 10-20% of total cobalt production comes from unregulated artisanal and small-scale miners.

China is a major player in the cobalt industry, significantly influencing the cobalt market in Africa. For example, over 50% of the cobalt production in DRC is achieved with Chinese investments, mostly through joint ventures with Gécamines. By 2023, Chinese firms owned or had stakes in 15 of the 19 cobalt-producing mines, such as China Molybdenum (CMOC), the primary shareholder in the Tenke Fungurume Copper-Cobalt Mine (TFM), as well as Jinchuan, Huayou Cobalt, Congo Dongfang Mining, Comika Mining/Wanbao Mining, and Hunrui Cobalt.[79] Also, a substantial portion of the DRC's artisanal cobalt is sold in trading warehouses known as "dépôts" or "comptoirs," where it is collected by Chinese companies. This cobalt is often refined within the DRC before being exported to China for further processing. Meanwhile, Chinese investments in other cobalt-rich countries are comparatively less.

Another critical mineral used in EV batteries is nickel, which plays a key role in enhancing energy density and translates directly into improved performance parameters, such as an extended driving range and increased battery longevity for EVs. Indonesia, Australia, Brazil, and Russia hold more than 70% of the world's nickel reserves, with Indonesia alone producing over half of the global nickel supply in 2023.

Currently, it is estimated that African countries hold 5.6% of global nickel reserves. Some of the largest nickel producers in Africa include Zambia, Zimbabwe, Madagascar, South Africa, and Côte

[79] Center for Strategic and International Studies (October, 2023), 'A Window of Opportunity to Build Critical Mineral Security in Africa'.

d'Ivoire.[80] Specifically, in South Africa, GlobalData estimates that out of the 186 operational nickel mines worldwide, 127 are located in the country. However, Africa's overall nickel potential and capabilities remain significantly underestimated and undetermined, presenting lucrative opportunities for future investments. New nickel mines have been explored in recent years. Some notable examples of successful nickel mine investments include the Enterprise Mine (Canada) in Zambia—the largest nickel project in Africa—the Kabanga Nickel Project (UK) in Tanzania, and the Zeb Nickel Project (Canada) in South Africa. As a major player in refined nickel, China's investments are primarily focused on nickel-rich Indonesia, which means future investments can also unleash new opportunities in Africa as well.

4.1 Steps to establish a battery value chain

Africa is experiencing a rapidly growing demand for batteries, driven by the expanding market for EVs and energy storage solutions. EVs present a promising opportunity for decarbonizing mobility and improving urban air quality in the region. Currently, EVs account for less than 5% of all vehicles in Africa, with South Africa at 7.5%.[81] However, this share is set to increase significantly as countries introduce incentives for EV adoption. Across the continent, electric two- and three-wheelers (2/3Ws) are gaining popularity and becoming increasingly vital for daily passenger and commercial transportation. In Kenya alone, there are over 40 startups providing electric bicycles, motorcycles, tuktuks, cars, and buses.[82] And among the registered EVs in Kenya in 2023, around two-thirds are electric motorcycles.[83] The rise of electric buses is also significant. BasiGo, Africa's largest electric bus company, has an order book of 350 buses, representing almost 2% of electric bus sales outside of China in 2023.[84] The company aims to sell an additional 1,000 electric buses in Kenya and 200 in Rwanda in the coming years.

Africa possesses both the raw materials and the growing demand necessary for battery production. There is also strong political will to add value to raw materials and develop battery and electric vehicle industries, with countries implementing policies that ban raw material exports and promote domestic processing, such as the recent agreement between the governments of DRC and Zambia to jointly develop the battery value chain.[85] To transition from raw materials to battery production, there are three critical steps:

1. **Raw material processing**: processing and refining of raw material into precursors for battery materials.
2. **Cell component production**: manufacture of specialized battery components: cathode and anode materials, electrolytes, separators and casings**.**
3. **Battery cell/pack production**: fabrication of battery cells, then integration into the battery pack including electronics, sensors and battery management system.

[80] Quartz (March 2022), 'How the Nickel Crisis may Impact Africa'.
[81] IEA, 'Global EV Outlook 2024'
[82] Africa E-Mobility Alliance (AfEMA), 'EV Importation and Industrialisation - KENYA'.
[83] Africa E-Mobility Alliance (AfEMA), 'EV Importation and Industrialisation - KENYA'.
[84] IEA, 'Global EV Outlook 2024'
[85] United Nations Economic Commission for Africa (Apirl, 2022), ' Zambia and DRC Sign Cooperation Agreement to Manufacture Electirc Batteries'.

4.1.1 STEP ONE: RAW MATERIAL PROCESSING

Currently, only limited processing is happening in Africa. On lithium, in Zimbabwe, after the government banned raw lithium export in 2022, mining firms have invested in processing facilities to produce lithium concentrates and export these. However, no further processing into battery-grade lithium exists. However, projects to produce battery-grade lithium are in the pipeline in Zimbabwe, DRC, Zambia and South Africa.[86][87][88] In Zimbabwe, investors plan to construct an integrated battery minerals industrial park where lithium, nickel, graphite will be processed into battery-grade minerals. In comparison, the processing industry for cobalt and copper in the DRC and Zambia is more developed, with several refineries and processing plants producing cobalt cathode, copper cathode and cobalt hydroxide (See table 9). Battery grade cobalt sulphate processing is missing but the refinery is in pipeline in Zambia, DRC and Morocco. Currently both DRC and Zambia export these semi-processed products abroad but they have the potential to be integrated into the regional battery supply chain. For other minerals, manganese and aluminum are refined to battery-grade in South Africa, while nickel and cobalt are refined into sulfates in Madagascar.[89][90] In Morocco, companies like CNGR and Al Mada are planning to process phosphate for precursors of lithium iron phosphate (LFP), leveraging Morocco's rich supply of phosphate.[91]

Opportunities for raw materials processing in Africa are abundant, as the continent is rich in reserves of all essential battery minerals. Establishing battery processing facilities closer to the sources of these materials can significantly lower costs and reduce supply chain emissions by minimizing transportation distances. In a 2021 study conducted by BloombergNEF, it was found that building a 10,000 metric-ton precursor facility in the DRC would cost approximately US$39 million.[92] This figure is three times lower than the estimated cost for a similar facility in the United States, also cheaper than comparable projects in China and Poland that are projected to cost $112 million and $65 million respectively. The lower costs in the DRC are primarily due to cheaper land, permits, and construction expenses. Moreover, the study also calculated that producing precursors in the DRC for battery packs assembled in Germany and cells manufactured in Poland could reduce the life-cycle emissions of the cells by 30% compared to producing the precursors in China, and by 9% compared to production in Poland.

4.1.2 STEP TWO: CELL COMPONENT PRODUCTION

Cell components include cathode and anode materials, electrolytes, separators, and casings. While both upstream and downstream industries are still developing, the manufacturing of cell components is still in its infancy in Africa. This is not unique to Africa; globally, cell component production is heavily concentrated in East Asian. Currently, China, South Korea and Japan collectively account for over 90% of the world's installed capacity for cathode and anode materials manufacturing. However, there are promising developments on the horizon. Several Chinese companies have announced plans to invest in the production of cathode and anode materials in Morocco, suggesting a potential shift in the global manufacturing landscape (see table 10).

[86] Reuters (May, 2024), 'Zimbabwe Lithium Miners Table Refinery Plans under Government Pressure'.
[87] BloombergNEF, 'The Cost of Producing Battery Precursors in the DRC'.
[88] Trade & Industrial Policy Strategies, 'Opportunities to development the lithium-ion battery value chain in South Africa'.
[89] Trade & Industrial Policy Strategies, 'Opportunities to development the lithium-ion battery value chain in South Africa'.
[90] Ambatovy. 'Our Products'.
[91] Yicai Global (September, 2023), 'China's CNGR, Al Mada Plan Joint Venture to Build Battery Material Projects in Morocco'.
[92] BloombergNEF, 'The Cost of Producing Battery Precursors in the DRC'.

Table 10: Announcement of cell components and battery pack investment in Africa

	Country	Investor	Products
Cell component Production	Morocco	CNGR Advanced Material Company (China)[93] Al Mada (Morocco)	Cathode materials
	Morocco	BTR New Material (China)[94]	50,000-ton cathode materials
	Morocco	Shinzoom (China)[95]	Anode materials
	Morocco	LG Chem Ltd (South Korea)[96]; Huayou Group (China)	50,000-ton LFP cathode materials
	Zambia	Megamillion Zambia Ltd (South Africa)	50,000 tpa of copper foil
	Morocco	Zhejiang Hailiang (China)[97]	25,000 tpa of copper foil
	Morocco	Tinci Group (China)[98]	100,000 tonnes of electrolytes
Battery cell/pack production	South Africa	Afrivolt (South Africa)[99] Partner: ReElement Technologies (USA)	5 GWh/y of battery cells for stationary storage applications, EVs in the medium term
	South Africa	Megamillion Energy Company (South Africa)[100]	Lithium batteries for stationary and e-mobility applications
	Morocco	Gotion High-Tech Company (China, Germany)[101]	Cell components, cells and lithium batteries
	Zambia	Airumi New Energy, Better Technology Group (Jiangxi Multi-Facility Economic Zone) (China)[102][103]	Lithium batteries for stationary and e-mobility application

[93] CNGR (September, 2023), 'A Contract Signed for Jointly Building a New Energy Battery Material Base in the Pan-Atlantic Region by CNGR and Al Mada Group'.
[94] Enterprise (April, 2024), 'China's BTR Invests USD 297 mn EV Battery Production in Morocco'.
[95] Reuters (May, 2024), 'China's Hailiang, Shinzoom to Build Auto Battery Plants in Morocco'.
[96] LG (September, 2023), 'LG Chem Teams Up with Huayou Group to Build LFP Cathode Plant in Morocco'.
[97] Enterprise, 'Hailiang Set to Build USD 288mn EV Battery Parts Plant in Morocco'.
[98] Atalayar, 'The Chinese Conglomerate Tinci Group Relocates its Electrolyte Production Project from the Czech Republic to Morocco.'
[99] Afrivolt (January, 2024), 'AQORA Rebrands to afrivolt™ to Spearhead Cell Manufacturing and Drive Economic Growth in Africa's Battery Industry'.
[100] Megamilion, 'A $2 Billion Initial Investment into Africa's Future'.
[101] Enterprise (June, 2024), 'The First Phase of Gotion High-Tech's Morocco EV Battery Gigafactory is in the Works'.
[102] AllAfrica (May, 2024), 'Zambia: Car Batteries Project Becoming Reality'.
[103] Zambian Mining Magazine (October, 2023), 'Better Technology Car Battery Production Shceduled for May 2024'.

4.1.3 STEP THREE: BATTERY CELL/PACK PRODUCTION

Battery cell and pack production in Africa is currently limited, with no operational lithium battery cell and pack manufacturers for EVs across the continent.[104] While cell manufacturing and large-scale battery production remain absent, some assembly activities for energy storage solutions are taking place, primarily in South Africa. Companies like Polarium and Solar MD are importing battery cells to manufacture batteries for backup power in solar and grid applications.[105][106] Furthermore, in the last two years, there have been investment announcements regarding the establishment of lithium battery factories in Africa, with a focus on Morocco and South Africa, which are the continent's leading automotive manufacturing markets. Additionally, smaller-scale factories are planned in Zambia. In South Africa, Afrivolt is set to construct a cell factory capable of producing 5 GWh of battery cells annually, targeting both stationary storage applications and the e-mobility sector in the medium term.[107] Meanwhile, Morocco is attracting significant investment from a Chinese German firm, Go-tion Hi-Tech Company, which plans to develop a gigafactory for producing LFP cells and battery packs. This facility is expected to become one of the largest gigafactories globally, integrating the supply chain from cell component production to battery assembly.[108] Table x summarizes investment plans in the lithium battery cell components, cells and pack production in Africa.

There are multiple pathways for African countries to enter the battery value chain, leveraging their unique strengths and resources.[109] For countries like Zimbabwe, the DRC, and Zambia, the focus can be on utilizing their advantages in critical mineral extraction to expand into processing raw materials and producing precursors. This foundational step is crucial for eventually advancing into the manufacturing of cell components and battery cells. Then Morocco, with its established manufacturing capabilities in the automotive industry and strategic access to major markets like the EU and the US, is well-positioned to start with downstream activities, such as EV battery assembly and cell production. These activities will attract further investments in the production of cell components, and the processing and refining of raw materials. Lastly, South Africa, with its proximity to critical minerals and relatively well-established manufacturing capabilities and domestic market, can simultaneously engage in both upstream refining and processing, and downstream assembly and manufacturing.

Existing investment plans indicate that capital tends to move more swiftly when there is a clear market presence, as seen in Morocco and South Africa. In the resource rich countries, precursor production can serve as a vital first step in building the industrial capabilities necessary for comprehensive battery production. By enhancing domestic processing and manufacturing, African countries can potentially integrate into the global battery supply chain.

[104] Mining.com (June 2023), 'When will Africa Get its First Gigantic Battery Factory'.
[105] Polarium (April, 2022), 'Polarium Starts Production in New Factory in South Africa'.
[106] CleanTechnica, 'Construction Has Started at Africa's First Dedicated Gigawatt-hour Battery Factory in Cape Town.'
[107] Afrivolt, 'AQORA Rebrands to afrivolt™ to Spearhead Cell Manufacturing and Drive Economic Growth in Africa's Battery Industry'.
[108] FDI Intelligence (June, 2023), 'Gotion Explores Africa's first Gigafactory in Morocco'.
[109] ECDPM, 'An African battery value chain to kickstart green industrialisation'.

CHAPTER 5: AFRICA-CHINA MINERAL COOPERATION THROUGH FOCAC

China's grand policy direction in initiatives like the Forum on China-Africa Cooperation and the Belt and Road Initiative (BRI) is crucial for unlocking interest and financial incentives for cooperation between Chinese and African stakeholders. However, for any cooperation to be effective, African countries need to have a clear policy vision and set targets at the national and continental levels, before negotiating with Chinese actors. Over time, African nations have been exerting more agency and collective efforts to shape this relationship. For instance, in FOCAC 8 (2021), references were made to all six of the 10-year frameworks of the African Union's Agenda 2063. In FOCAC 9 (2024), even more references were made throughout FOCAC documents, showing a stronger alignment of FOCAC priorities with the continent's development agenda.

While FOCAC 8 and FOCAC 9 made significant progress on African objectives, including climate action, gaps remain. For example, although both FOCAC referred to the African Mining Vision, there was little detail on how China might support it. Addressing these gaps is crucial. While regions and countries like the US, Europe, and China have been engaging competitively to ensure the security of critical minerals supply, there has been a lack of targeted focus on what African countries truly want and need, especially concerning growth, poverty reduction, and climate action.

Despite the intertwined trade and investment ties between China and Africa in the mining sector, minerals and mining were consistently neglected in past FOCAC commitments. FOCAC 8 was the first to include mineral development in its action plan, i.e. Dakar Action Plan (2022-2024) with one direct reference. The reference to mining was found under the '3.3 Industrial Partnership and Production Capacity Cooperation' pillar of Economic Cooperation, with a focus on expanding value addition and supporting infrastructure in the mining industry. The scope expanded further in the 9th FOCAC Summit, which included six references related to minerals and mining in the action plan (2025-2027), with one of these directly referred to critical minerals.

Table 11: Reference to minerals/mining in FOCAC Action Plans

FOCAC 9	2.2.3 The partnership initiative for industrial chain cooperation. China will support Africa in developing local value chains, manufacturing and deep processing of critical minerals... 3.4.2.9 The two sides will work more closely to combat crimes that infringe upon the safety of life, environmental degradation and national security such as illegal mining of gold and other minerals 5.2.9 The two sides will work together to maintain the stability of the mineral supply chain, promote mineral value addition in Africa by developing smelting technology, support the expansion of smelting, processing and other upstream and downstream sectors of mining industry as well as infrastructure construction, and explore mining deep processing projects in Africa, with a view to transforming Africa's resource endowments into advantages of economic development. 7.1.1 ... Recognize that value-addition is a priority, China will support Africa's mineral value chain upgrading through direct investment in refining and processing. 8.2.4 China will support African countries in conducting vocational medical skills training to help Africa enhance professional competencies in ... training for engineers and technicians in the mining sector. 9.2.9 The two sides speak positively of the importance of the China-Africa Geo-science Cooperation Center in technology application, information sharing and green mining and

	will jointly carry out practical cooperation in geo-science research, mineral development geohazards management and talent cultivation, so as to help Africa achieve economic, social and environmental sustainability.
FOCAC 8	3.3.5 The two sides will continue to support expansion of industrial chains in the mining industry, increase investment in smelt, processing and other upstream and downstream sectors of mining industry as well as electricity, transportation and other supporting infrastructure, launch mineral processing projects in African countries, and build resource-development cooperation zones to promote local industrial development and support translating resource endowments into advantages of economic development.
FOCAC 7	None
FOCAC 6	3.9.2 The Chinese side will encourage Chinese financial institutions to provide financing and insurance support for China-Africa cooperation in energy, mining, agriculture, processing manufacturing, shipping, metallurgy, construction materials, information and communication technology, electricity, railways, highways, ports and airports.
FOCAC 5	4.5.6 The two sides will encourage their financial institutions to provide financing support for China-Africa cooperation in energy, mineral exploitation, agriculture, processing, manufacturing, telecommunications and infrastructure, such as electricity, railroad, highway and port facilities.
FOCAC 4	None
FOCAC 3	3.7.2 The two sides agreed to step up scientific and technological cooperation in areas of common interest including agricultural bio-technology, solar energy utilization, geological survey, mining and development of new medicine.
FOCAC 2	None
FOCAC 1	None

However, it is worth noting that these references in the latest FOCAC Beijing Action Plan, while more comprehensive, are very brief, lacking details, and are integrated under different themes as a small part of broader discussions. Given that the mining sector stands as the second largest destination for Chinese FDI in Africa and the foremost export category from Africa to China, and the surging demand for critical minerals in the application of transition technologies, the current level of attention in the FOCAC framework still does not adequately reflect the sector's economic significance to Africa-China relations and the African economies.

In the outcomes of bilateral engagements between China and African countries during FOCAC, critical minerals receive relatively limited attention. The primary focus of these bilateral statements on climate revolves around addressing climate change, power generation, and general green development. Only Nigeria and Zimbabwe specifically emphasize enhancing mining cooperation and encouraging Chinese investment in value chain upgrading. On mining projects, Nigeria signed an MoU with two Chinese companies, China Civil Engineering Construction Corporation (CCECC) and Sinomach-He, for a US$1 billion iron ore-to-steel project in Kogi State. This project aims to shift Nigeria's mineral sector from raw material exports to local processing, increasing value addition.[110]

The pivotal role of mining in Africa's sustainable development and industrialization calls for greater emphasis. The sector deserves more attention in bilateral discussions and a dedicated mining

[110] Nairametrics (Sept 2024), 'Nigeria signs $1 billion MoU with Chinese firms for Iron Ore-to-Steel Project in Kogi State'.

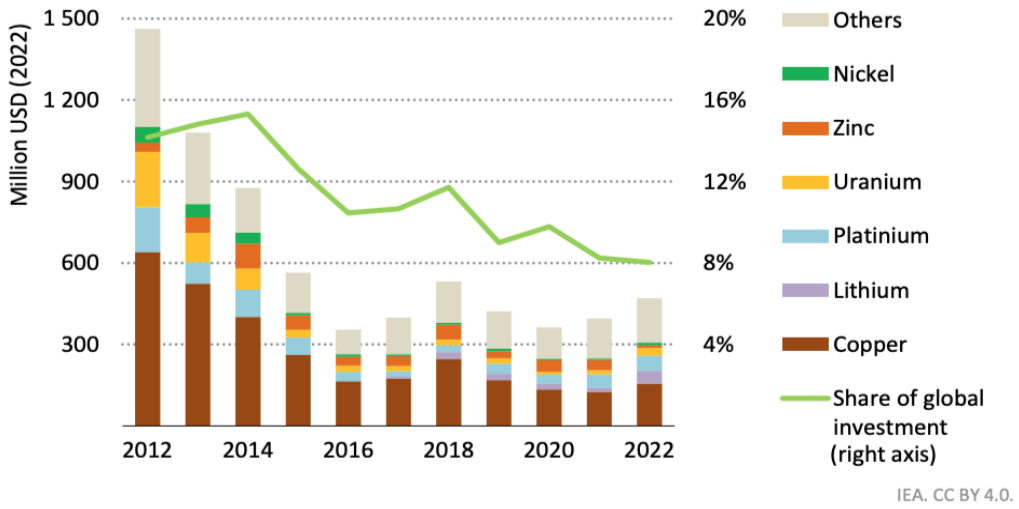
partnership pillar within the FOCAC framework. This pillar should include concrete and detailed commitments, with a particular focus on critical minerals, to ensure that the economic potential of this sector is fully realized for mutual benefit.

While the AMV and the AUCS guide continental mining policy, the upcoming AGMS will offer further direction on how critical minerals can power Africa's green industrial development. Through these frameworks, Africa has laid out a clear vision for the future of its mining sector, and China can play a pivotal role in supporting the implementation of these strategies, realizing its commitment of 'transforming Africa's resource endowments into advantages of economic development'.

Both the AMV and the AGMS Approach Paper identify the lack of geological knowledge and mapping as the first major constraint. Geological knowledge is crucial for several reasons. Accurate geological data underpins the exploration and identification of mineral deposits, enabling more effective and efficient resource extraction. A robust understanding of the geological landscape allows for better planning and risk management in mining operations. Furthermore, comprehensive geological knowledge facilitates the discovery of new mineral resources, leading to the expansion of the mineral base in Africa.

Currently, Africa's geological knowledge is limited due to insufficient data and outdated exploration techniques. Many regions lack detailed geological maps and assessments, which hampers effective resource management and decision-making. Without up-to-date geological information, African countries struggle to attract investment and fully leverage their mineral potential. According to the IEA, investment in exploration for critical minerals in Africa has been decreasing over the last decade, with Africa's share of global investment falling from 15% in 2014 to 8% in 2022 (see Figure 16).[111]

Figure 16: Investment in exploration for selected mineral resources in Africa, 2012-2022



Source: IEA, 'Financing Clean Energy in Africa'.

[111] IEA, 'Financing Clean Energy in Africa'.

Therefore, improving surveys and mapping, and building geoscience capacity in Africa is a critical first step towards developing critical minerals. Currently, apart from a handful of national geoscience centers, such as the Council for Geoscience in South Africa, there is only one regional institution—the African Minerals and Geosciences Centre (AMGC). The AMGC, with eight member states from East and Southern Africa, provides services in mineral exploration, laboratory analysis, and training for geoscientists. However, this institution alone is insufficient to meet the growing needs of the continent. There is a clear need to either expand the AMGC's membership and mandate or establish a continental geoscience body that can conduct comprehensive geological surveys, facilitate data sharing across Africa, and promote innovation in geoscience technologies.

Discussions around Africa-China cooperation in geoscience began during the 7th FOCAC Summit and were included in the 8th FOCAC Dakar Action Plan (2022-2024). In March 2023, China realized its commitment to establishing the China-Africa Geoscience Cooperation Center, hosted under the China University of Geosciences in Wuhan, China.[112] However, for this center to effectively contribute to Africa's geoscientific capacity, it should be based in Africa and actively engage in programs designed to transfer knowledge and technology to the continent.

This proposed commitment aims to strengthen Africa's mineral exploration and extraction capabilities by providing detailed and reliable geological data that can attract both domestic and international investment, including from Chinese stakeholders. It will not only foster the development of the mining sector in Africa but also expand industrialization opportunities. This initiative aligns with Africa's needs as expressed through the AMV and AGMS, which emphasize the importance of advanced geological knowledge and technological innovation to drive economic growth and resource efficiency. By addressing these foundational requirements, Africa can better harness its mineral wealth to achieve sustainable development and greater economic resilience.

5.1.1 PROPOSED COMMITMENT TWO

China and Africa to strengthen cooperation in mining technology and human resources development

To build the geoscientific knowledge and technical capacity for the mining industry, developing mining technology and human resources is another crucial aspect. Various technologies are essential to the mining industry. For instance, mining technologies for drilling and blasting provide access to mineral deposits. Automation and control systems enhance efficiency and safety. Processing technologies such as advanced crushing, grinding, and separation methods improve the recovery rates of valuable minerals, increasing profitability. Environmental and safety technologies, including water treatment systems, dust suppression, and tailings management, ensure compliance with environmental regulations and protect the health of workers and nearby communities. Information and communication technologies, like mine management software and real-time data monitoring, optimize operations and maintenance. Human resources, encompassing geologists, mining engineers, metallurgists, environmental scientists, safety professionals, technicians and data scientists provide the expertise needed to leverage these technologies effectively.

Currently, the insufficient development of local human resources and technological expertise in Africa limits the efficiency, safety, profitability and sustainability of the mining industry. China and

[112] China University of Geosciences (Apr 2024), 'African Institute of China-Africa Geosciences Cooperation Center Inaugurated at CUG'.

Africa have accumulated rich experience in capacity building, technology sharing and human resources development in the agriculture sector under the FOCAC framework. The two sides can extend this collaboration to the mining sector through various initiatives.

Training and Education Programs: Similar to the agriculture programs, China can send mining experts to African countries to carry out plan making, policy consultation, technical demonstration, on-site teaching and capacity training. Scholarships can be provided to African experts and researchers to study in China, earning academic degrees and engaging in cooperative research programs. Additionally, China can support the establishment of mining vocational technical schools in Africa and hold thematic skill training sessions for African experts in China, fostering a local talent pool and building training capacity.

Research and Development (R&D) Partnerships: China can implement programs for cultivating African young pioneers in geoscience, mining engineering and metallurgy research. Establishing China-Africa joint centers for modern metallurgy exchange, demonstration, and training will promote knowledge sharing and collaborative research efforts. Additionally, China can establish a regular event such as the Africa-China Forum on Sustainable Mining to share experiences, discuss challenges, and develop joint strategies for the mining sector's sustainable development.

This commitment will help African countries build capacity in mining technologies and develop human resources in metallurgy, mining engineering, environmental technologies, and environmental management. By doing so, it will enhance the efficiency, safety, profitability, and sustainability of the mining industry in Africa, attracting further investment and fostering long-term economic growth.

5.1.2 PROPOSED COMMITMENT THREE

China to Increase Infrastructure Financing for Africa's Regional Integration and Development of Critical Minerals Value Chains

Inadequate infrastructure in Africa is another major constraint identified both by AMV and AGMS Approach Paper. Infrastructure, particularly transport and energy infrastructure, is essential for mineral extraction, processing and trade. However, these critical infrastructures in Africa remain largely underdeveloped. On logistics, the continent is lagging, with 80% of goods transported by road, yet only 53% of the roads are paved.[113] The continent's railway network also remains sparse and fragmented, with a density estimated at 2.5 km per 1,000 km², significantly lower than the global average of 23 km per 1,000 km².[114] Energy infrastructure is similarly lacking, with 600 million Africans (43% of the population) lacking electricity access.[115] The energy impacts businesses, especially in mining, where reliable power is essential for operations.

China has been a significant partner in Africa's infrastructure development through initiatives like the Belt and Road Initiative (BRI) and the FOCAC. According to Boston University, between 2000 and 2022, China provided US$170.08 billion in loans to Africa, with 35.17% allocated to the energy sector and 28.89% to the transport sector.[116] In total, these two sectors accounted for almost two-thirds of Chinese loans to Africa. However, the data also shows a declining trend in Chinese financing since 2016, highlighting the need for China to commit to increased investment

[113] Center for Global Development, 'Bottlenecks in Africa's Infrastructure Financing and How to Overcome Them'. December 2023.
[114] FIE-Consult, 'Rolling Intra-Africa Trade on Standard Rails Across Borders'. https://fieconsult.com/rolling-intra-africa-trade-on-standard-rails-across-boarders/
[115] IEA, 'Africa Energy Outlook 2022'. https://www.iea.org/reports/africa-energy-outlook-2022/key-findings
[116] Moses, Oyintarelado, Dianah Ngui, Lucas Engel and Abbi Kedir. 2024. "China-Africa Economic Bulletin, 2024 Edition." Boston University Global Development Policy Center and African Economic Research Consortium.

in Africa's infrastructure. FOCAC 9 signaled a renewed interest, with China committing to implement 30 connectivity infrastructure projects across Africa in the next three year.

The development of critical mineral supply chains need to take into consideration the complementary infrastructure, particularly in energy and transportation. Refining, processing, and manufacturing all require substantial, reliable, and affordable power. To reduce the carbon footprint of critical minerals, increased investment in renewable energy is essential, particularly in projects that are close to mineral extraction, processing, and component manufacturing sites. The resource rich countries also have large untapped potential for renewable energy, for instance, a study conducted by Development Reimagined found that DRC and Zambia are among the top 5 African countries that offer significant untapped opportunities and a strong demand for energy investment.[117] the DRC has enormous potential for solar and hydroelectric power, with 217 exploitable hydroelectric sites identified for development, while Zambia offers substantial opportunities in solar and wind energy.[118] China could leverage its resources and knowledge in renewable energy and play a key role in developing these resources through platforms such as FOCAC and BRI, enhancing local energy capacity and supporting sustainable industrial growth.

Transport and logistics infrastructure are also critical to the efficiency and success of the critical mineral supply chains. To secure the flow of critical minerals and their intermediates from Africa, the EU and the US have signed MoUs with the DRC, Zambia, and Angola to develop the Lobito Corridor and the new Zambia-Lobito rail line. The Lobito Corridor is a strategic transportation route that links the port city of Lobito on the Atlantic Ocean in Angola to the northeast border with the DRC and Zambia's Copperbelt province. This route is designed to facilitate the efficient movement of critical minerals, particularly those essential for clean technologies like cobalt and copper, from their sources to markets in Europe and North America. Meanwhile, China has offered to refurbish the 1970s-Chinese build TAZARA railway that connects Zambia's Copperbelt province and Tanzania's Dar es Salaam port for over US$ 1 billion and operate it under the Public-Private-Partnership.[119]

However, both projects, the Lobito Corridor and the Tazara railway are heavily concentrated around minerals extraction, and that does not align with Africa's broader development priorities. To ensure that Africa's resources are not merely exploited but utilized to foster local industrial growth, the refurbishment of the TAZARA line should strategically align with the needs of developing critical mineral supply chains. This includes developing mineral processing industrial parks along the railway and considering an expansion to link with Zimbabwe. Expanding the line to Zimbabwe would not only integrate a broader range of mineral inputs needed for manufacturing products based on minerals, but also connect with the growing market in Southern Africa, creating a more comprehensive and competitive regional supply chain.

Furthermore, China can play a key role in advancing Africa's infrastructure development priorities on global platforms, such as the G21.[120] **Firstly**, China could contribute by advocating for the inclusion of Africa's infrastructure needs on the G21 agenda and calling for the expansion of the G20 Global Infrastructure Hub's portfolio to cover all African countries. **Secondly**, China should increase concessional financing for infrastructure projects in both low- and middle-income African nations, while actively collaborating with debt-distressed countries to explore innovative solutions for debt relief. **Additionally**, China could also help develop new risk-sharing mechanisms that

[117] Development Reimagined (February 2024), 'Briefings; Where are Africa's Top 5 Destinations for Chinese Renewable Investment?'
[118] Development Reimagined (February 2024), 'Democratic Republic of Congo'.
[119] Bloomberg, 'China Proposes a $1 billion Tanzania-Zambia Railway Revamp'.
[120] Development Reimagined (2024), 'African Priorities for the G21'. Available here.

reduce the financial burden of cross-country infrastructure projects. These approaches should serve as the foundation for new G21 funds designed to collectively mobilize resources, enabling countries to pool risk and funding. This would ultimately lower the medium- and long-term development costs for African nations, making flagship infrastructure projects more feasible and sustainable.

5.1.3 PROPOSED COMMITMENT FOUR

China to encourage value addition and supply chain upgrading for critical minerals in Africa

To harness Africa's resource endowment for long-term economic growth and sustainability, it is crucial to add value to minerals and upgrade supply chains. This strategic focus is recognized by African strategies including AMV, AUCS and AGMS. Currently, the majority of Africa's critical minerals are exported in their raw forms as ores and concentrates, leading to limited opportunities for economic diversification, minimal value capture, and little possibility for technology transfer and industrialization. For instance, while cobalt ore was traded at US$191 million with a unit value of US$6.28 in 2022, cobalt hydroxide (a type of refined cobalt) was traded at US$9.3 billion with a unit value of US$20.2.[121] The DRC supplies 70% of cobalt globally, but only accounts for 1% of global refined production, creating a significant missed opportunity for value capture.[122]

China, on the other hand, is the major global player in mineral refinement and processing. It accounts for over half of global processing capacity and worldwide production for critical minerals. According to IEA, China produces 90% of the world's processed rare earth elements, 42% of copper, 65% of lithium, 17% of nickel, 100% of graphite and 74% of cobalt.[123] With the growing emphasis on critical minerals and evolving industrial policies in Africa, many African nations are implementing policies and strategies to ban the export of raw materials. To maintain its global dominance, China should encourage the relocation of processing and refinement facilities to Africa, closer to where the raw materials are sourced.

This commitment is reflected in the FOCAC 8 and FOCAC 9 Action Plans, which state, *"The two sides will continue to support the expansion of industrial chains in the mining industry, increase investment in smelting, processing, and other upstream and downstream sectors of the mining industry."* However, more substance can be added to this commitment, such as:

Halt Export of Raw Materials: China to commit to stopping the export of raw critical minerals such as lithium, cobalt, and copper from Africa. This will ensure that part of the value-addition processes occurs within the continent, fostering local industrial growth and creating job opportunities.

Build Processing and Refining Facilities: China to offer preferential financing and technical support for the construction of state-of-the-art processing and refining facilities in key African mining countries. These facilities will process minerals as manufacturing feedstocks for resource-based industrialization in Africa.

Refinement Localization Clauses: China to advocate for the inclusion of localization clauses in mining contracts that mandate a specified percentage of refinement to occur within African

[121] UNCTAD, 'Technical Note on Critical Minerals - Supply chains, trade flows and value addition'.
[122] Cobalt Institute, 'Cobalt Market Report 2022'.
[123] IEA, 'Share of top three producing countries in processing of selected minerals, 2022'. https://www.iea.org/data-and-statistics/charts/share-of-top-three-producing-countries-in-processing-of-selected-minerals-2022

countries. This approach ensures that a portion of the value chain remains within the continent, benefiting local economies.

Joint Ventures and Partnerships: China to encourage Chinese companies to form joint ventures with African firms. Such collaborations can facilitate technology transfer and skill development, enhance local expertise, strengthen partnerships and boost the capacity for mineral processing within Africa.

By committing to these specific actions beyond the original statement, China can support the transformation of Africa's mining sector, advancing the continent's objectives of value addition, industrialization, and sustainable economic development. This commitment to value addition will not only support Africa's mining industry but also solidify China's leadership in the global critical minerals processing and manufacturing sectors, fostering mutually beneficial economic partnerships and strategic collaboration between China and Africa.

5.1.4 PROPOSED COMMITMENT FIVE

China to support Africa build resource-based green industries, particularly the battery and EV sectors

To propel Africa's economic diversification and industrialization, it is essential to harness the continent's abundant mineral resources in ways that extend beyond traditional mining. Resource-Based Industrialization (RBI) is a strategic approach endorsed by African strategies including AMV, AUCS and AGMS. This approach emphasizes leveraging mineral resources to drive growth across various sectors, including manufacturing, construction, power, and agriculture.

Given the urgency of addressing climate change, the development of clean energy technologies, particularly in the battery and EV sectors, is gaining strategic importance globally. African nations are taking active steps to realize their resource-based green industrial ambitions. A notable development is the joint Battery and Electric Vehicle initiative between the DRC and Zambia. With the two countries holding over 80% of the minerals necessary for EV battery production, this collaboration aims to harness their mineral wealth to create a comprehensive value chain in the electric battery and clean energy sector.[124]

The agreement between DRC and Zambia provides a robust framework for bilateral cooperation on establishing emerging green value chains. This initiative is set to unfold within Special Economic Zones dedicated to the production of battery precursors, batteries, and electric vehicles. By pooling their resources, DRC and Zambia aim to unlock substantial economic potential, fostering industrial growth and creating job opportunities. Similarly, several African nations such as South Africa, Morocco, and Ghana have started targeting the opportunities arising from critical minerals for clean energy transition, such as EV manufacturing.

China, as a global leader in battery and EV manufacturing, is uniquely positioned to support Africa in achieving these ambitious goals. ***First***, it should actively participate in the DRC-Zambia BEV initiative by offering technical expertise, investment, and strategic advice. China could provide financing and technical support in feasibility studies, consultancies, and technical assistance to the implementation of this agreement. ***Second***, China can facilitate collaboration by encouraging Chinese investment in African green industries, particularly through partnerships with local

[124] UNECA, 'Zambia and DRC Sign Cooperation Agreement to manufacture electric batteries'. https://www.uneca.org/stories/zambia-and-drc-sign-cooperation-agreement-to-manufacture-electric-batteries

businesses and governments. ***Third***, China should expand its support beyond the DRC and Zambia by investing in similar resource-based green industrial initiatives across the continent. This can be achieved by identifying and investing in key projects in other mineral-rich countries with potential for green industry growth. ***Finally***, China can establish resource-development cooperation zones that integrate mineral resources with downstream value chains such as construction, electronics, and manufacturing.

This commitment aims at developing robust industrial ecosystems, linking mineral extraction with value-added production processes, with a goal to build sustainable value chains that enhance economic diversification, foster industrial growth, and drive innovation. This approach not only maximizes the economic benefits derived from mineral resources but also supports broader industrialization efforts across multiple sectors, ensuring that Africa's mineral wealth contributes to long-term, inclusive development.

5.1.5 PROPOSED COMMITMENT SIX

China to promote sustainable mining practices that are aligned with ESG standards

A sustainable mining sector should not come at the expense of the environment and local communities. As envisioned by the AMV, a sustainable and well-governed mining sector should be "safe, healthy, gender and ethnically inclusive, environmentally friendly, socially responsible, and appreciated by surrounding communities." [125] Ensuring alignment with international Environmental, Social, and Governance (ESG) standards is crucial for mining industry players, and this is a core component of all African mining strategies.

Given China's significant role in Africa's mining industry, it is vital that Chinese companies strengthen cooperation to achieve sustainable and responsible production and sourcing of raw materials. FOCAC 9 committed to combat illegal mining but more action is needed. This includes:

Enhanced Due Diligence and Traceability*:* Chinese firms should commit to rigorous due diligence and traceability practices to ensure that their operations conform to legal standards and that no "blood diamond" practices or other forms of exploitation occur, particularly in the cobalt industry where unethical practices have been widely reported.

Combatting Illegal Trafficking*:* China should work with African governments and international organizations to combat illegal trafficking of raw materials. This would involve improving oversight, enhancing law enforcement cooperation, and increasing transparency in supply chains.

Aligning with ESG Standards*:* Chinese companies should ensure that their operations align with international ESG standards, focusing on environmental protection, social responsibility to local communities, and governance. This includes respecting human rights, avoiding child labor, and ensuring fair labor practices.

Investing in Infrastructure for Sustainability*:* Given that mineral extraction and refining are complex, energy-intensive, and polluting activities, Chinese investments should incorporate physical infrastructure for waste management and environmental protection. This includes building facilities that manage mining waste, mitigate water and land use impacts, and reduce emissions from mining activities.

[125] AU, 'Africa Mining Vision'.

Commitment to Transparency and Stability*:* Chinese firms should be transparent in their operations and actively contribute to peace and stability in the regions where they operate. This involves engaging with local communities, ensuring fair distribution of mining benefits, and avoiding practices that contribute to conflict or social unrest.

By committing to these sustainable practices, China can help ensure that Africa's mining sector not only contributes to economic growth but also supports social and environmental sustainability. This will be crucial in building a mining sector that is not only profitable but also beneficial for African communities and the environment.

CHAPTER 6: CHALLENGES AND CONCLUSION

When analyzing the dynamics surrounding Africa's critical mineral trade and supply chain strategies, it's essential to consider the bilateral relationships between African nations and major global powers, particularly China and the US and the EU. The US and Europe rely on established supply lines from Africa for strategic minerals, yet they remain deeply intertwined with China for value-added manufacturing, such as digital technology infrastructure and clean energy products.[126] This dependency is a focal point for Washington, which is seeking to shift this dynamic through the reauthorization of the African Growth and Opportunity Act (AGOA). China, on the other hand, has solidified its position as a preferred development partner for many African governments due to its track record in delivering infrastructure support, debt relief, and other economic benefits. However, in the race for critical minerals, Africa's true ally will be the countries that centers Africa's development priorities, supports value addition in critical minerals, enhances trade, and strengthens Africa's position within global value chains.

To center Africa's development priorities, several challenges must be addressed to make critical mineral cooperation truly mutually beneficial. One major issue is the lack of transparency and accountability in the sector, which has led to environmental degradation and the displacement of communities in mineral-rich areas.[127] Without meaningful reforms, profit risks being prioritized over the well-being of citizens and environmental sustainability. Moreover, the Africa Mining Vision often takes a backseat as governments pursue individual bilateral agreements, resulting in fragmentation and missed opportunities for a unified approach to resource development.

Foreign investment, which many African governments rely on, often shifts economic priorities to align with the interests of creditors rather than local populations. This has led to widespread issues, including pollution, human rights abuses, and illegal mining activities.[128] For instance, in 2023, Nigeria suspended Chinese mining operations due to illegal titanium ore mining activities.[129] Namibia and DRC followed suit. Similarly, the DRC, a major supplier of cobalt and coltan, faces severe governance challenges, with reports of human rights abuses in illegal mining operations. The lack of political will to address these issues often stems from the prioritization of corporate interests over local communities.

To achieve sustainable resource development, African countries must strengthen their governance frameworks and enforce accountability within the critical minerals sector. The African Continental Free Trade Area (AfCFTA) offers a strategic opportunity to boost intra-African trade and build industrial capacity, which could help Africa rebalance its asymmetric economic relationships with global powers.[130]

Zimbabwe serves as a case study in this regard. Since 2022, Chinese companies have invested over US$1.4 billion in acquiring lithium projects in Zimbabwe, and in 2023, they were awarded additional licenses that could generate another $2.79 billion in the mining and energy sectors. While these investments signal significant economic progress, they also bring substantial challenges. In rural areas like Mutare and Buhera, dozens of indigenous households have been

[126] Carnegie Endowment for International Peace, 'How the AGOA Reauthorization Process Could Help Diversify U.S. Critical Mineral Supplies'.
[127] SAIIA, 'Navigating Governance Challenges in African Critical Mineral Supply Chains'.
[128] SSRN, 'Prospects and Challenges for the Export of Rare Earths From Sub-saharan Africa to the EU'.
[129] Ibid.
[130] Carnegie Endowment for International Peace, 'New Africa Program Director Spotlight: Zainab Usman'.

displaced due to lithium mining operations,[131] highlighting the social and environmental costs of rapid mining expansion.

African countries are increasingly concerned about the barriers to the sustainable development of their critical mineral resources, including gaps in regulation, widespread human rights abuses, illegal trading practices, and corruption. If these concerns are not addressed, foreign entities will continue to exploit regulatory loopholes, leading to environmental degradation, community displacement, and missed revenue opportunities. To counter these challenges, African countries must prioritize the enforcement of accountability measures and rigorously screen projects for their socioeconomic and environmental impacts. Placing the interests of African populations at the center of the critical minerals boom is essential for lasting development.

It is increasingly recognized that for Africa to advance its economies and improve living standards, harnessing the wealth from its mineral resources through value addition is essential. Regional cooperation, particularly through the Regional Economic Communities, is crucial in fostering synergy for mutual growth. While Africa may not yet compete on a global scale, developing the value chain for critical minerals is imperative for the continent's long-term economic stability and growth. For example, China leverages its sovereign funds to extend its economic influence globally, and similarly, African countries can strategically allocate available revenues to solidify the foundational aspects of their value addition industries.[132]

To center Africa's development priorities in the critical mineral race, African nations shall consider adopting a hybrid approach that blends protectionist policies with strategic trade initiatives. This approach would help shield their economies from the undue influence of large economic blocs while simultaneously fostering the development of trade chains essential to the success of the AfCFTA, particularly in the critical minerals sector. The existing diplomatic and multilateral relationships between African nations and these global powers should be leveraged to provide tangible support for the growth of emerging African industries, ensuring that these partnerships deliver real value and contribute to the continent's industrialization.

Lastly, African countries need to amplify their voices on platforms such as FOCAC and the BRI to ensure their development priorities are at the forefront of negotiations with China. In the space of critical minerals, China should commit to six key areas of cooperation: (1) supporting the establishment of African geoscience institutions to enhance geological mapping, (2) advancing mining technology and skills through training and research partnerships, (3) increasing investments in essential infrastructure like transport and energy, (4) encouraging localized mineral processing to retain more value within the continent, (5) investing in Africa's emerging green industries, particularly in battery and EV sectors, and (6) ensuring Chinese companies adhere to international ESG standards, promoting responsible and sustainable mining practices. The recent FOCAC 9 shows that Africa is asserting its position and shaping the future of Africa-China cooperation in the critical minerals sector, but more discussions and detailed commitments need to follow.

While this report focuses on Africa-China cooperation in the critical minerals sector, future analyses should explore engagement with other foreign partners. Each partnership—whether with major powers like the US and Europe, or emerging economies like India and the Middle East—

[131] Climate Home News (January 2024), 'Lithium Boom: Zimbabwe Looks to China to Secure a Place in the EV Battery Supply Chain'.
[132] African Development Bank (2021), 'African Natural Resources Centre. Lithium-Cobalt Value Chain Analysis for Mineral Based Industrialization in Africa'.

presents distinct strengths and weaknesses, from technological expertise to investment capacities. Tailoring these reports to specific partnerships will provide a comprehensive understanding of Africa's positioning in the global critical minerals race, helping African nations align their development priorities with the opportunities offered by different global actors.

ANNEX 1: LIST OF LITHIUM PROJECTS IN AFRICA WITH INTERESTS FROM CHINA-BASED COMPANIES[133]

Project Name	Country	Lithium Reserve	Owners	Development Stage
Manono	Democratic Republic of Congo	6,640.0	AVZ Minerals Ltd. (optionor) 51%; La Congolaise d'Exploitation Miniere SPRL (venturer) 25%; *Suzhou CATH Energy Technologies Co. Ltd.(optionee) 24%	Feasibility
Goulamina	Mali	1,570.0	*Ganfeng Lithium Group Co. Ltd. (venturer) 45%; Leo Lithium Ltd. (venturer) 45%; Government of Mali (carried) 10%	Pre-production
Arcadia	Zimbabwe	775.2	*Zhejiang Huayou Cobalt Co. Ltd. (venturer) 87%; private interest (venturer) 13%	Pre-production
Bikita	Zimbabwe	NA	Bikita Minerals (Pty) Ltd.^ (owner) 100% *Bikita Minerals (Pty) Ltd. was acquired by China-based Sinomine Resource Group Co. Ltd. in July 2022	Operating
Bougouni	Mali	236.5	Kodal Minerals PLC (owner) 100%; *Ganfeng Lithium Group Co. Ltd. (fractional); Leo Lithium Ltd. (fractional); private interest (fractional)	Feasibility
Zulu	Zimbabwe	213.2	Premier African Minerals Ltd. (optionee) 100%; *private interest (optionor)	Operating
Kamativi	Zimbabwe	154.6	CAT Strategic Metals Corp. (optionee) 60%; Zimbabwe Mining Development Corp. (optionor) 40%; *private interest (optionor)	Late stage
Bitterwasser	Namibia	105.2	Arcadia Minerals Ltd. (optionee) 50%; *private interest (optionee) 50%; LexRox Management Services (Pty) Ltd. (optionor); unnamed owner (optionor)	Late stage
Karibib	Namibia	53.9	Lepidico Ltd. (venturer) 80%; *private interest (venturer) 20%	Pre-production

[133] S&P Global (2023), 'China's global reach grows behind critical minerals'. Available here.

Uis	Namibia	53.3	Montero Mining, Exploration Ltd. (optionee) 95%; *private interest (owner) 5%; Namibia Silica CC (optionor)	Late stage
Brandberg	Namibia	NA	*Private interest (owner) 100%	Early stage

*As of June 2023

Source: S&P Global Market Intelligence.

About Development Reimagined

Development Reimagined (DR) is a pioneering, African-led, women-led, Africa-first and award-winning international development consultancy, with headquarters in Beijing and offices in the UK and Kenya. DR was created in response to the complexities of global poverty and sustainable development – which requires new ideas, and new solutions. DR - and the clients we work with - invest in thoughtful insights backed by cutting-edge analytics and deep relationships.

Since its creation in 2018, DR has developed industry-leading expertise embedded in practical experience on five of the world's most consequential issues: Africa-China relations, development finance, climate action, global trade, and decolonising development. We aim to develop and promote African perspectives and leadership by working with African and other countries, organizations, and brands to develop inclusive, sustainable, and scalable strategies for growth and change – including through trade, finance and other foreign policy, while providing thought leadership to reshape humanitarian and development aid from and to all over the world into more equitable and exit-able systems.

Website

LinkedIn.

Twitter.

Instagram.