

**SPECIAL REPORT:**

# GROWING DEMAND FOR AFRICA'S CRITICAL MINERALS INTENSIFIES GEOPOLITICAL RIVALRIES

The global critical minerals market is adapting to heightened demand from renewable energy sectors and Fourth Industrial Revolution (4IR) technologies, leading to growing shifts in geopolitical dynamics. This includes major powers diversifying sources away from dominant suppliers such as China due to recent global events like the COVID-19 pandemic and Russia's invasion of Ukraine. In response, regions rich in minerals, such as Africa and the Middle East, are becoming focal points for new mining investments and strategic partnerships. Simultaneously, the United States and European Union Countries are reformulating policies to secure and stabilise mineral supply chains, reflecting the increasing importance of these resources for future technological advancements and economic security.

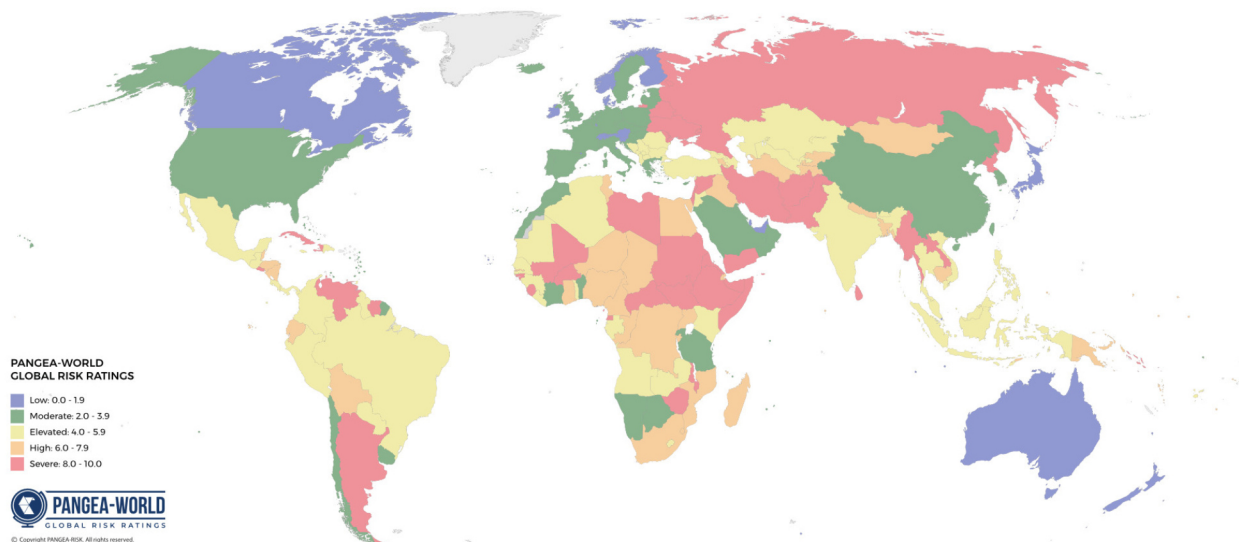
As the world's clean energy transition and Fourth Industrial Revolution (4IR) technologies gather pace, the demand for critical minerals is expected to grow quickly. This heightened demand places Africa's mining sector at the centre of geopolitical competition due to its pivotal role as a supplier of many critical minerals necessary for these energy transitions. This shift is visibly marked by the United States' (US) renewed engagement with African producers such as Zambia and the Democratic Republic of Congo (DRC). Deposits of graphite, lithium, and rare earth elements in these regions are experiencing an upsurge in exploration activity and competition from both Chinese and Western buyers. This trend is anticipated to extend benefits not only to established producers but also to mid-tier, smaller, or less-explored mining markets in countries like Côte d'Ivoire, Mozambique, and Namibia, making them increasingly attractive to investors.

Despite these opportunities, Africa's mining industry predominantly operates on a "pit-to-port" model, where mineral ores are extracted and exported for processing elsewhere. The security and reliability of these critical mineral supply chains are of strategic importance to many countries, especially in light of the expected surge in global demand driven by clean energy technologies. Historically, concerns regarding Africa's mining sector have revolved around fears of Chinese dominance over the production of critical minerals and, more recently, Russia's interests in West African gold. However, companies from Saudi Arabia and the United Arab Emirates (UAE), armed with substantial financial resources, have shown they can outbid more established players in the industry, as demonstrated by recent competitive activities in Zambia.

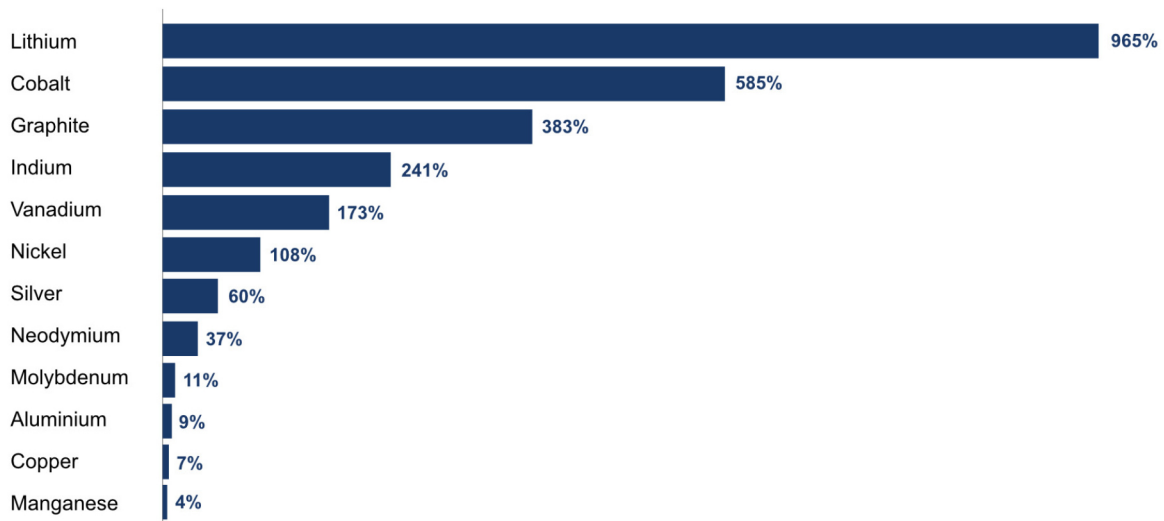
PANGEA-RISK assesses the geopolitical and economic factors influencing the global critical minerals sector, focusing on the challenges and opportunities within Africa and the Middle East and their implications for international markets and supply chains.

## Future technologies and renewable energy drive demand

The dynamics of supply and demand for these minerals, deemed essential for various industrial and technological applications, have seen considerable fluctuations over recent years. 2023 was characterised by a decline in demand due to economic slowdowns, particularly in China, against a backdrop of increasing supplies. Despite these challenges, the outlook for 2024 and beyond suggests a resurgence in demand, driven primarily by the transition towards renewable energy sources and 4IR technologies, which necessitates extensive quantities of diverse raw materials.



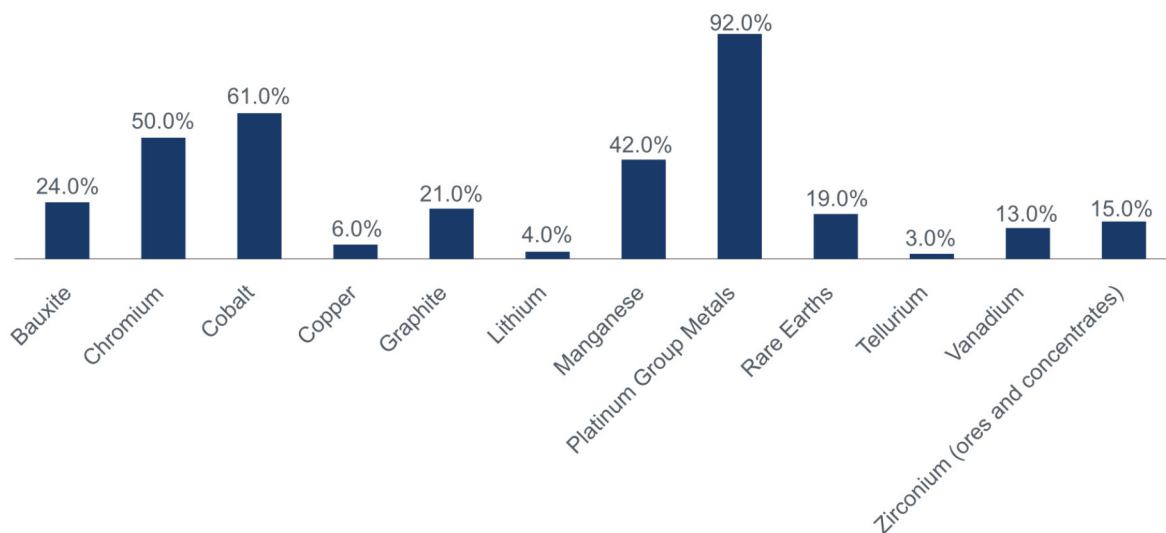
## PROJECTED DEMAND GROWTH BY 2050 (PERCENT)



Source: World Bank

Projected increases in demand for critical minerals are staggering, with the World Bank estimating a rise of up to 500 percent by 2050 for certain minerals. This surge is anticipated to be driven by the renewable energy sector, where minerals like lithium might see demand increases exceeding 1,500 percent, as per recent reports by the United Nations Conference on Trade and Development (UNCTD). The financial implications are substantial, with the International Monetary Fund (IMF) forecasting global revenues from the extraction of crucial metals like copper, nickel, cobalt, and lithium to reach approximately USD 16 trillion by mid-century.

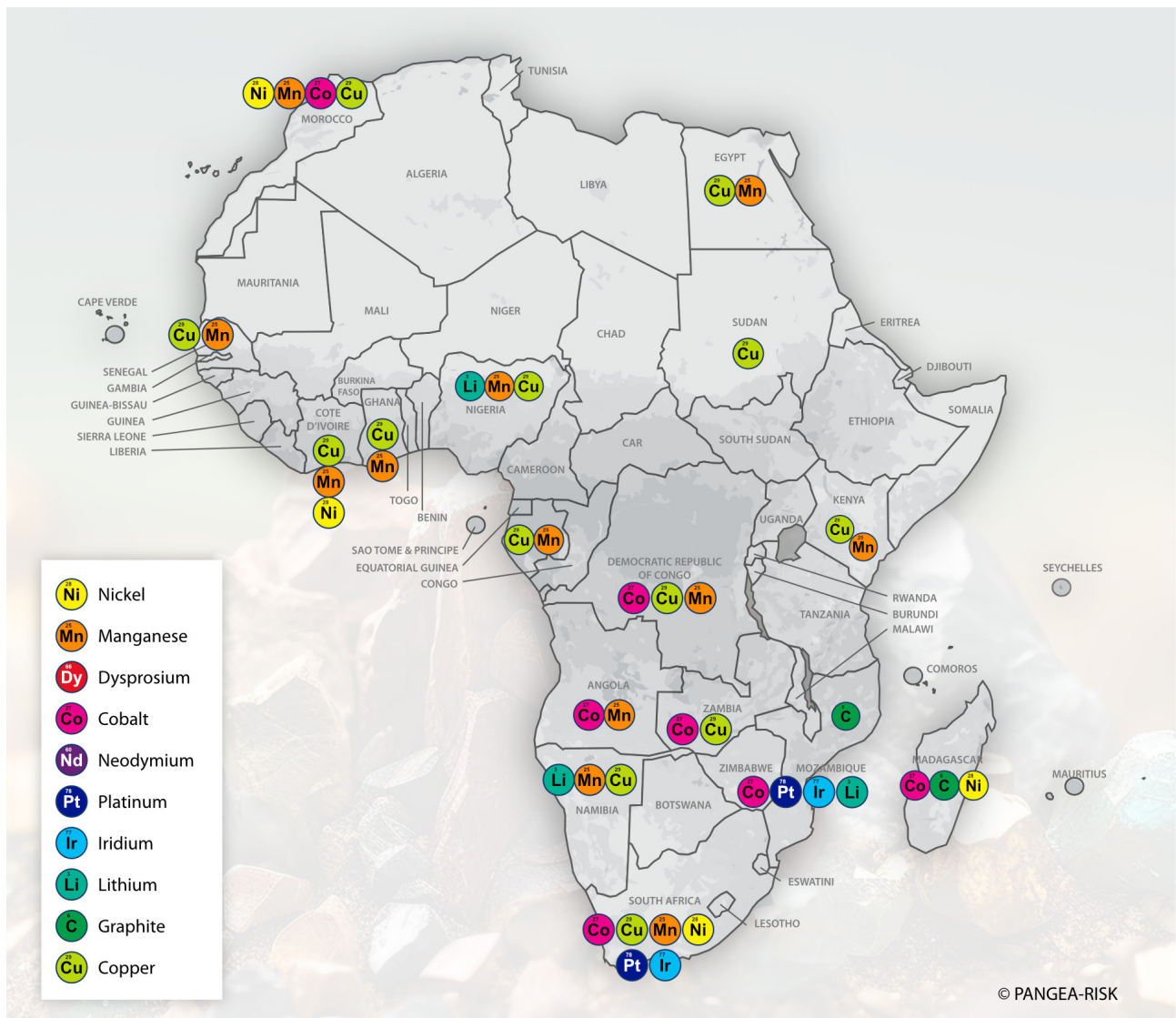
## AFRICA'S GLOBAL SHARE OF SELECTED CRITICAL MINERAL RESERVES, 2023



Source: US Geological Survey and US Department of the Interior, 2023

Africa's role in the global critical minerals market is increasingly pivotal, holding about 30 percent of the world's reserves. It is particularly rich in platinum group metals (92 percent), cobalt (50 percent), and manganese (42 percent), which are essential for renewable energy technologies and the broader transition towards a net-zero global economy. However, much of Africa's mineral wealth is exported raw, primarily to China, which dominates the global processing market. This highlights a major opportunity for the continent to develop local processing industries and enhance value addition, which could spur substantial economic and developmental benefits.

Nevertheless, the sector faces important challenges, including a pronounced USD 225 billion investment shortfall in critical mineral mining projects necessary to meet future demands. The emergence of new mining projects and the expansion of existing ones are essential to closing this gap. However, geo-political and economic factors also play a disruptive role, with sanctions and trade restrictions potentially complicating the global supply chain for these materials.



## SELECTED CRITICAL MINERALS IN AFRICA



## Critical minerals in the Middle East

In the Middle East, Iran recently announced the discovery of considerable lithium reserves, estimated to be 8.5 million tons of lithium carbonate equivalent. This discovery positions Iran to potentially become a global supplier of the vital lithium needed in EV batteries and energy storage. It would make the deposit the second-largest known lithium reserve in the world after Chile, which possesses 9.2 million metric tons of the metal. However, attracting the enormous investments required to build extraction and refining infrastructure remains a crucial obstacle for Iran, given the persisting complexities around international sanctions.

Jordan has also taken steps to exploit its mineral wealth to become a major world supplier of vital components for renewable energy systems, such as solar panels and wind turbines. By leveraging its substantial phosphate and rare earth deposits, Jordan could carve out an important role in exporting specialised minerals to manufacturing and technology hubs globally. Türkiye is also advancing plans to develop its critical mineral reserves, with a focus on rare earth elements needed in advanced magnets and batteries. However, uncertainties about the concentrations of rare earths in Turkish mineral deposits pose technical challenges for viable extraction. Attracting international partners with advanced separation capabilities could enable Türkiye to harness its resources.

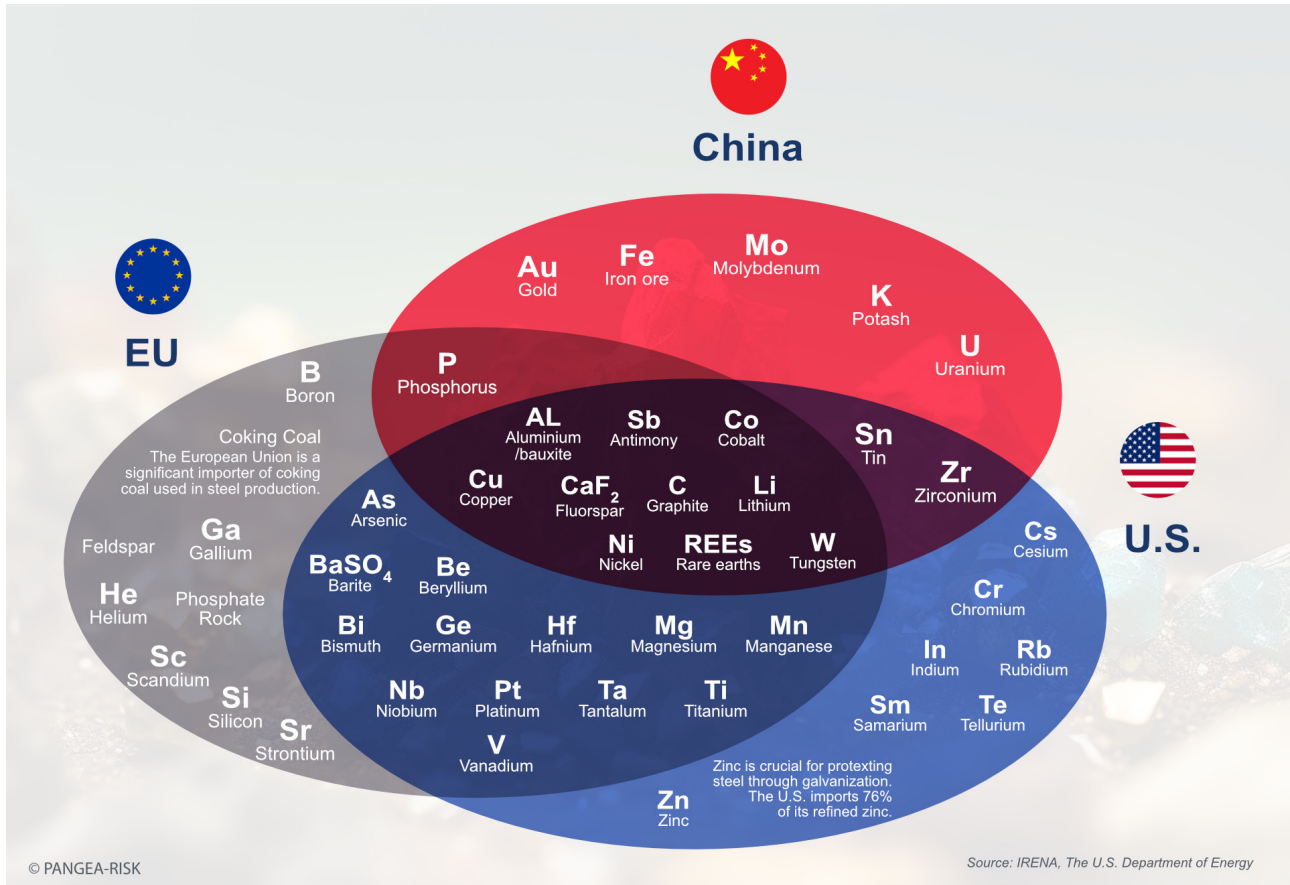
### PHOSPHATE MINING IN JORDAN



## A strategic asset for global powers

Critical minerals lack a universally accepted definition and are classified based on current technological needs and the interplay of supply-demand dynamics that vary across different countries and regions. For example, the European Union's (EU) list of critical minerals has expanded from 14 in 2011 to 34 in 2023, reflecting the rapid evolution of technology and the materials it requires. The US currently identifies 50 minerals as critical, a classification that is periodically reviewed and updated every three years to accommodate changes in industrial usage and technological innovations. Minerals such as cobalt, lithium, and nickel are universally recognised for their importance in 4IR and green technologies. Cobalt is crucial for consumer electronics like mobile phones, lithium for electric vehicle batteries and energy storage solutions, and nickel for various applications in durable goods and energy storage systems.

Each region has its specificities in terms of critical mineral resources and dependencies. The EU list notably includes phosphate rock, which is crucial for fertiliser production yet has limited local supplies, necessitating substantial imports primarily from Finland. Similarly, coking coal, vital for pig iron and steel production, is also listed by Europe and predominantly produced by China, which leads global output at 58 percent, followed by Australia, Russia, and the US. In contrast, the US is entirely dependent on imports of manganese and graphite and 76 percent dependent on cobalt imports, illustrating the strategic vulnerabilities associated with these critical materials.



## CRITICAL MINERALS TO GLOBAL SUPER POWER SECURITY

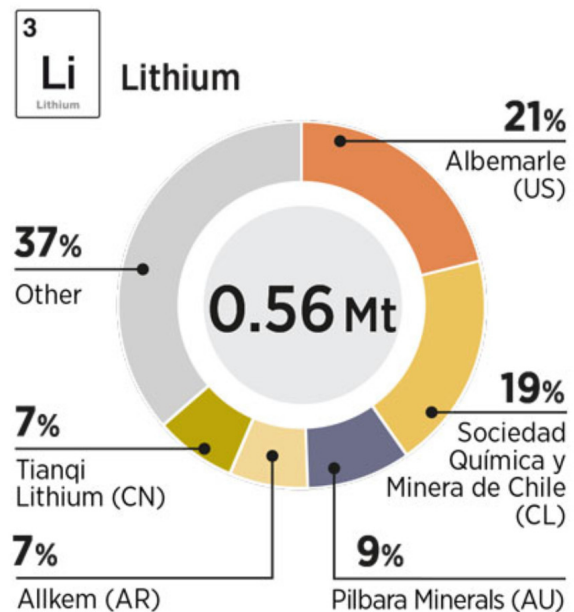
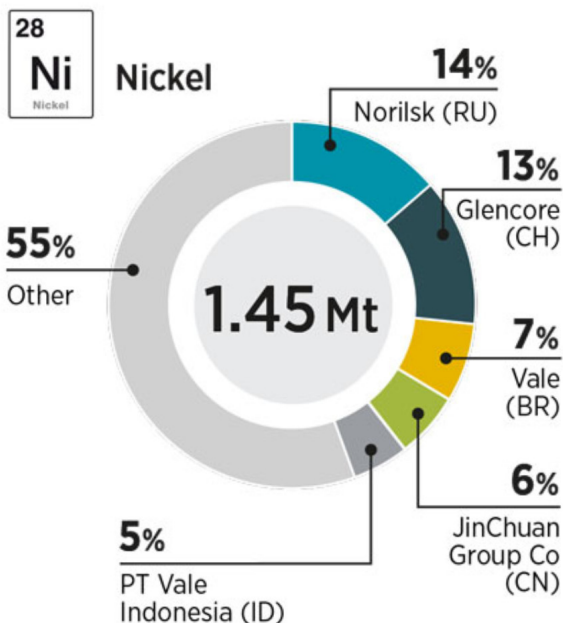
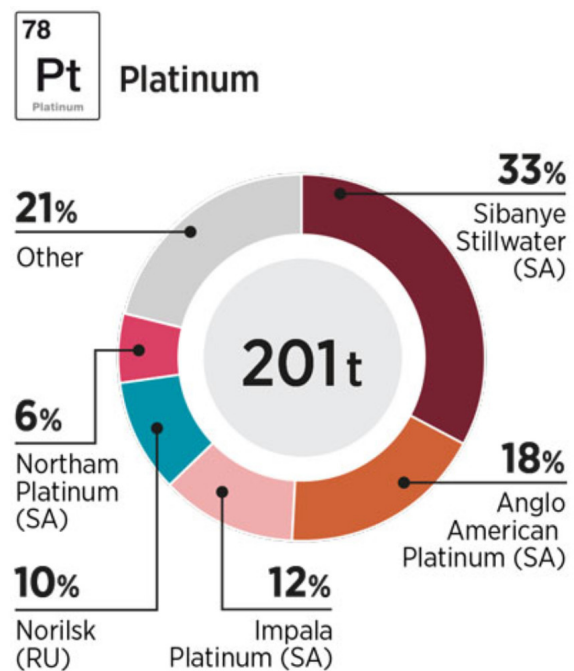
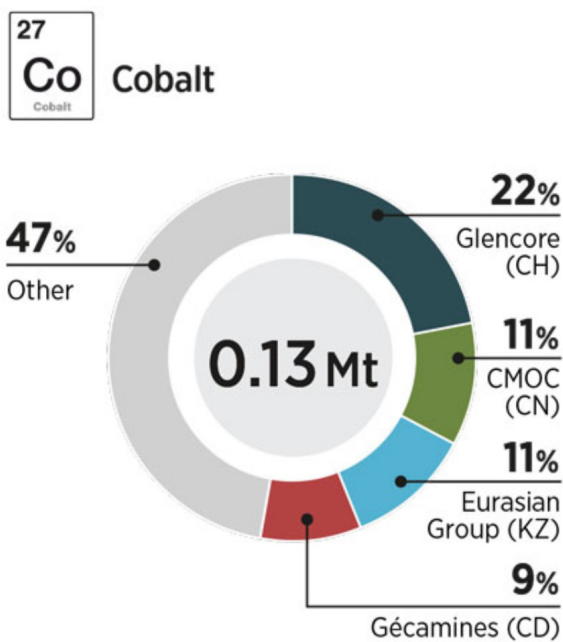




## LITHIUM MINING IN NEVADA, US

The domestic production capacity of the US is notably limited, hosting only one active nickel mine in Michigan and a single lithium source in Nevada. Conversely, China dominates the production of many critical minerals required for the green revolution, producing 60 percent of all rare earth elements used in advanced technological devices. China also maintains substantial lithium, nickel, and cobalt production capacities, processing 13 percent, 35 percent, and 70 percent of the global output, respectively. Furthermore, China includes gold and uranium on its critical minerals list, underscoring their strategic economic and geopolitical importance, especially in diversifying away from the US dollar. Recent acquisitions of approximately 400 tonnes of gold and intentions to become self-sufficient in nuclear power capacity highlight China's strategic resource management.

With China currently dominating the processing of lithium, cobalt, and rare earth elements, more and more countries are seeking to reduce their dependence on a single country to acquire critical minerals. Events like 2023's port congestion in China disrupted metal exports and China's imposition of limits on the export of rare earths, underscoring the risks of reliance on limited suppliers. Furthermore, the industry is highly concentrated, with a few companies controlling a major portion of global production and trade. The top five mining companies control 61 percent of lithium output and 56 percent of cobalt output.





## Shifting geopolitical dynamics

The COVID-19 pandemic fallout and Russia's war in Ukraine have sent Western governments scrambling to reduce their reliance on Chinese supply chains and disentangle their economies from Russia. In response, September 2023 saw the EU Parliament endorse the Critical Raw Materials Act, while the US introduced the American Battery Minerals Initiative and the Inflation Reduction Act, both aimed at enhancing access to critical minerals and promoting local production of green technologies. Similarly, Australia, Canada, India, and the UK have each published critical mineral strategies. The Minerals Security Partnership, involving 13 countries and the EU, has also been established to drive public and private investment in responsible critical minerals supply chains globally.

The US, seeking alternatives to Chinese dominance in battery metals and diminishing Russia's influence in the mineral markets, has turned its attention to Africa. A key US investment in Africa's mining sector is the Lobito Corridor project, which plans to construct over a thousand miles of railroad to facilitate the transport of critical minerals from Zambia and the DRC to a port in Angola.

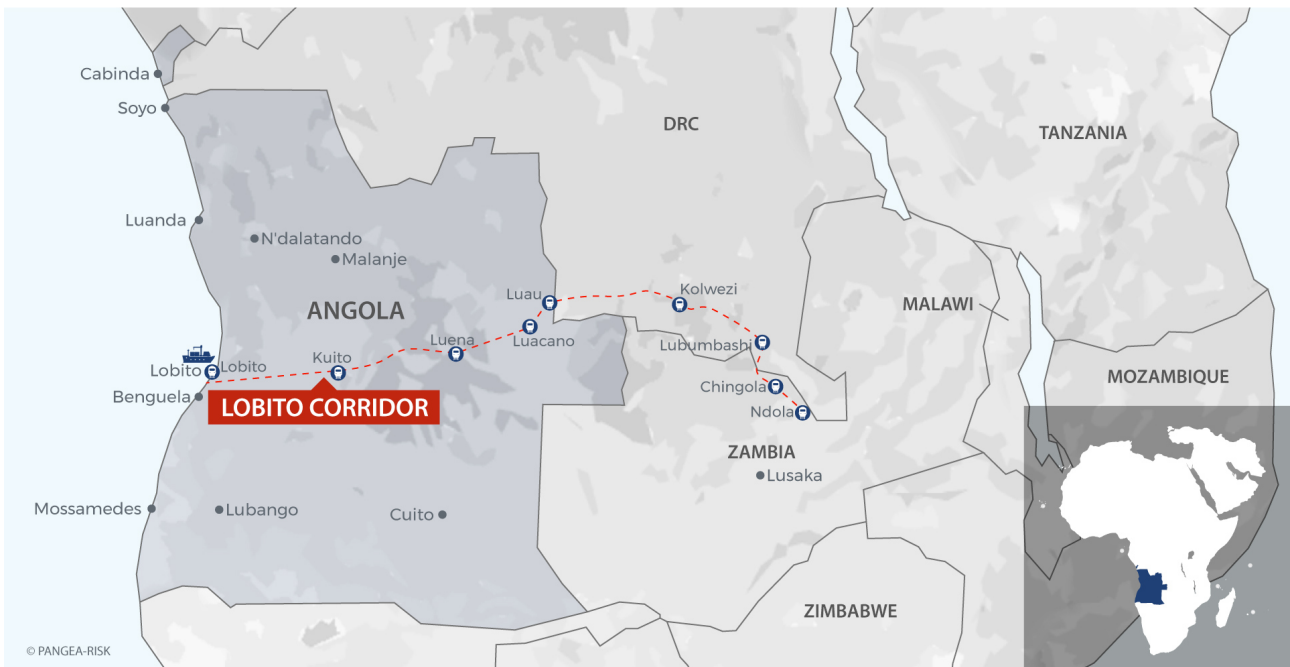
RUSSIAN PRESIDENT VLADIMIR PUTIN AND CHINESE PRESIDENT XI JINPING TOGETHER IN MAY 2024



Despite these efforts, the US is trailing behind China, which has spent the last decade securing access to essential minerals for products like electric vehicle batteries and solar panels. Chinese investments in Africa include substantial copper and cobalt projects in the DRC and Zambia and lithium projects in Zimbabwe, supported by substantial infrastructure funding. However, China's dominance in African mineral resources has faced increasing scrutiny and opposition from civil society and governments.

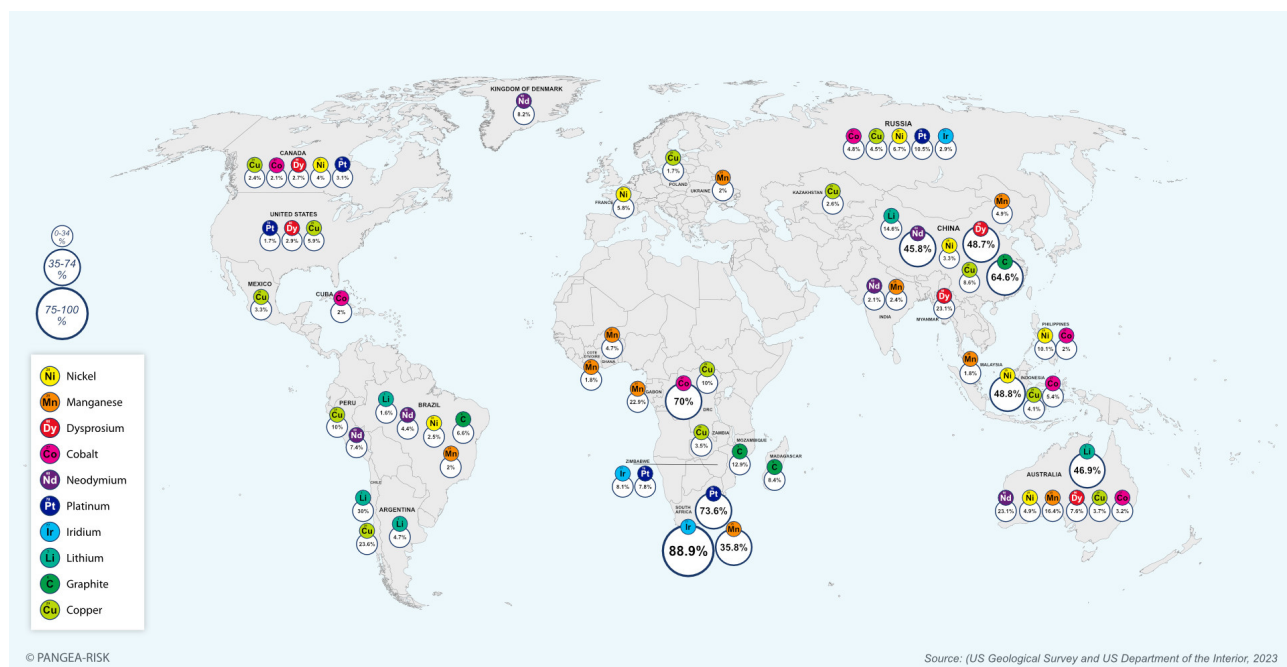


Compounding these issues, the US and the EU have implemented import restrictions to decrease dependence on China and foster cleaner supply chains. These restrictions, however, present challenges. In the US, stringent mineral origin mandates focus on national security, while Europe's clean supply chain laws prioritise human rights and environmental and sustainability standards. These laws restrict the procurement of critical minerals to geopolitically acceptable sources, exacerbating supply challenges and contributing to price volatility.



 LOBITO CORRIDOR IN ANGOLA AND DRC

An additional obstacle in building relationships in Africa is the growing influence of Russia, notably through its state-funded military company, the Wagner Group, now rebranded as Africa Corps. Through its paramilitary Africa Corps, Russia has expanded its role in African conflicts, using military support to combat insurgencies, extend political influence, and secure access to natural resources, including gold and potentially critical minerals. The strategic goals of these engagements are to secure physical resources and counteract Chinese and US efforts to establish their influence. Russian paramilitary units have a presence in Libya, Mali, the Central African Republic, Sudan, and, most recently, Burkina Faso. Russia presents a complex regional challenge for the US, as it offers a type of support that the US cannot match. This competition from Russia complicates US efforts to engage with Africa, as Russia's militaristic approach contributes to regional instability and displacement.



## SELECTED CRITICAL MINERALS BY SOURCE (% OF GLOBAL SUPPLY)

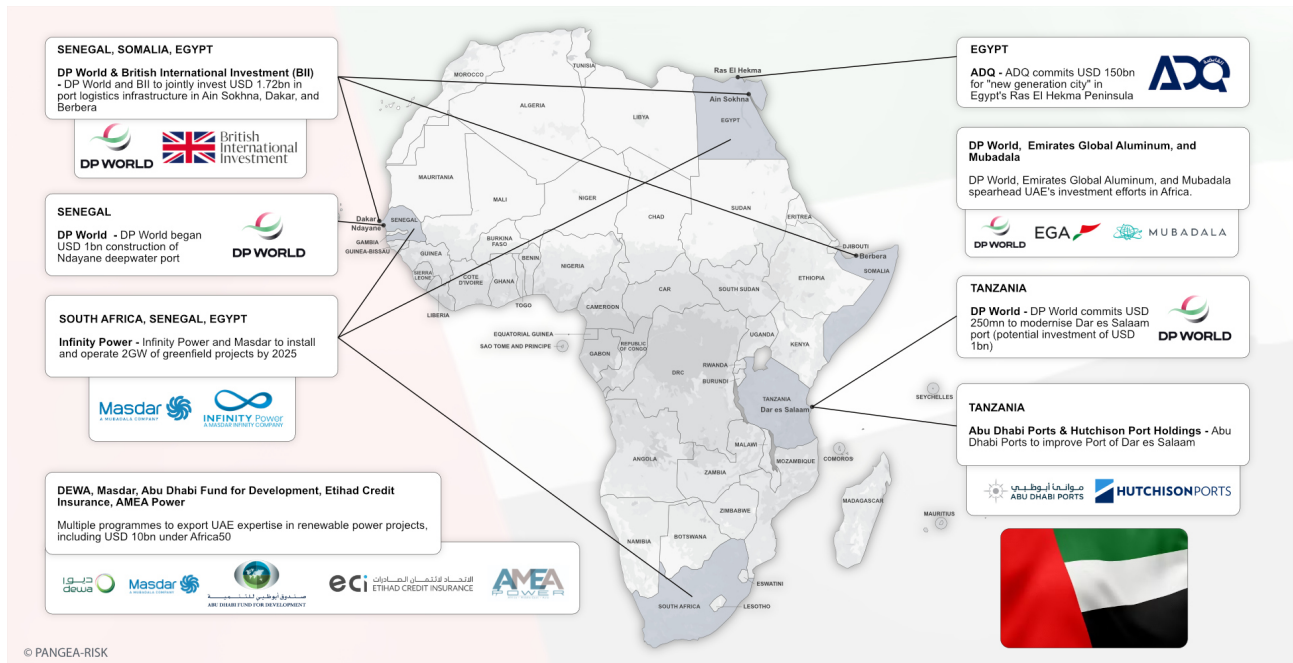
### Gulf countries' competitive advantages

Oil-rich nations such as Saudi Arabia and the UAE are intensifying their investments in critical minerals supply chains to diversify their economic portfolios and establish a presence in this burgeoning industry. Both countries have the financial capabilities to support their ambitions and maintain the political flexibility to simultaneously engage with major global powers such as Russia, China, and the US.

Saudi Arabia is particularly notable for its substantial reserves of critical minerals and its proactive strategy to develop these resources through international partnerships. Located in the western region of Saudi Arabia, the Arabian Shield is rich in precious metals such as gold and silver and essential industrial metals including aluminium, iron, copper, zinc, manganese, and chromium. Additionally, this region is significant for its supply of rare earth elements, including tantalum – of which it holds a quarter of the world's reserves, used in high-tech industries including electronics – and niobium, employed in industrial alloys for products such as jet engines and rockets.



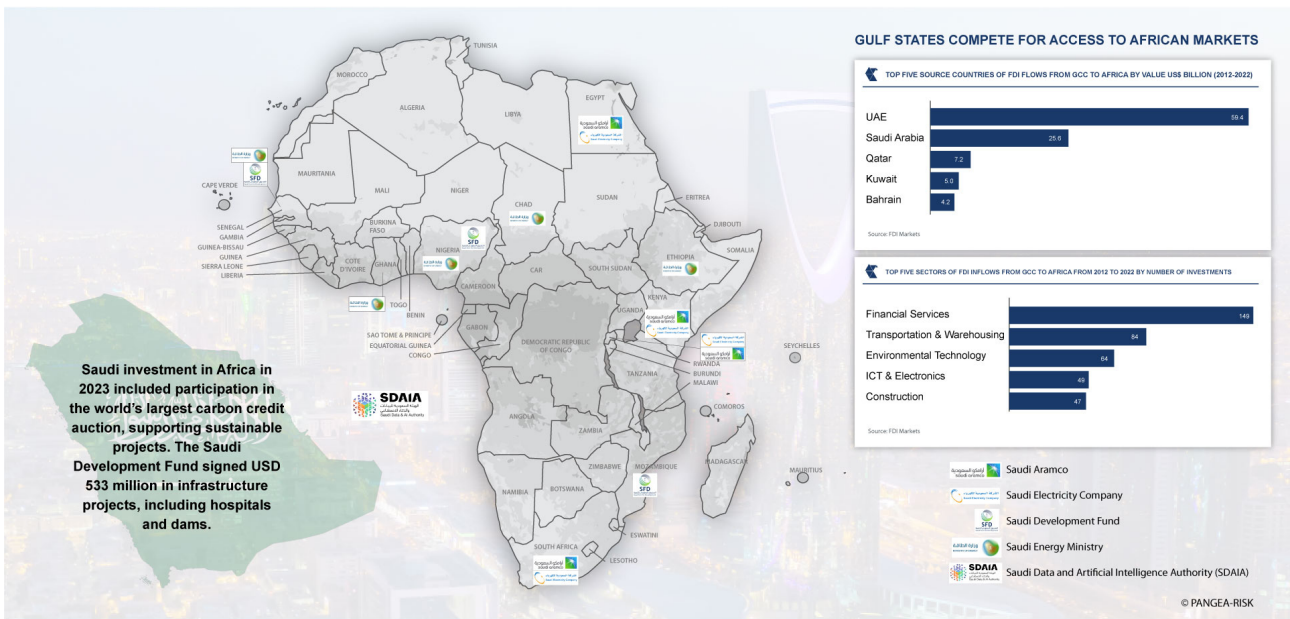
Recognising the strategic value of these resources, Saudi Arabia has incorporated the mining sector as a pivotal element of its Vision 2030 economic development plan. This plan aims to reduce its reliance on oil and gas revenues by leveraging over USD 1.3 trillion in mineral resources. This initiative seeks to attract private sector investments into underexplored areas and promote environmentally responsible extraction techniques.



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**UAE AS THE FOURTH LARGEST SOURCE OF FDI INTO AFRICA (2023-2024)**





**MAJOR SAUDI INVESTMENTS INTO AFRICA IN 2023**

To realise this vision, Saudi Arabia has been actively securing international partnerships, including signing memorandums of understanding focused on mining with several countries, such as the DRC, Egypt, Russia, the US, and Morocco. Discussions are reportedly ongoing between the US and the kingdom regarding acquiring mining stakes in various African countries. Furthermore, Saudi Arabia is exploring investment opportunities in Brazil and has sent a delegation to Argentina to discuss a potential collaboration involving Argentina's lithium resources.

The UAE is also advancing its position in the sector, demonstrated by a USD 1.9 billion mining partnership in the DRC and securing agreements in copper-rich Zambia. There are also reports of ongoing negotiations between the UAE and Australia regarding a free trade agreement that could facilitate the UAE's investments in Australia's critical minerals sector. Qatar is also entering the industry, having signed mining agreements with Nigeria and emphasised the importance of cooperation in the critical minerals space during discussions with the US.

**SAUDI CROWN PRINCE MBS HOSTING AFRICAN LEADERS**



## Critical minerals remain vulnerable to supply chain disruptions

The highly concentrated nature of critical mineral mining, processing, and refining exposes these supply chains to bottlenecks and chokepoints, which have been increasingly evident over the last year. Companies have faced substantial supply chain challenges, including prolonged delays in shipping and receiving goods, disruptions along major transportation routes, and rising costs. Notably, Houthi attacks in the Red Sea have resulted in extended transit times, escalating costs, and heightened sustainability concerns for mining operations. These disruptions contribute to increased freight rates and logistical expenses due to adopting costlier and less efficient transport routes, likely leading to higher operating costs for companies.

Looking ahead, it is expected that various governments will adopt protectionist measures that could further disrupt the flow of critical minerals, contributing to price volatility and altering downstream supply chains. For instance, China is poised to enforce export licensing requirements for graphite, which was established in 2023 as a countermeasure to US export controls on its semiconductor industry. Similarly, rare earth elements might be targeted next. In Africa, new regulatory measures are set to impact the mineral market: Tanzania will implement a ban on raw lithium exports, Nigeria will enforce an existing ban on mineral ore exports, and Ghana is contemplating similar policies. These regulations will restrict the flow of critical minerals and could particularly disrupt supply chains for Western electric vehicle (EV) battery manufacturers if a Chinese graphite export ban is enacted.

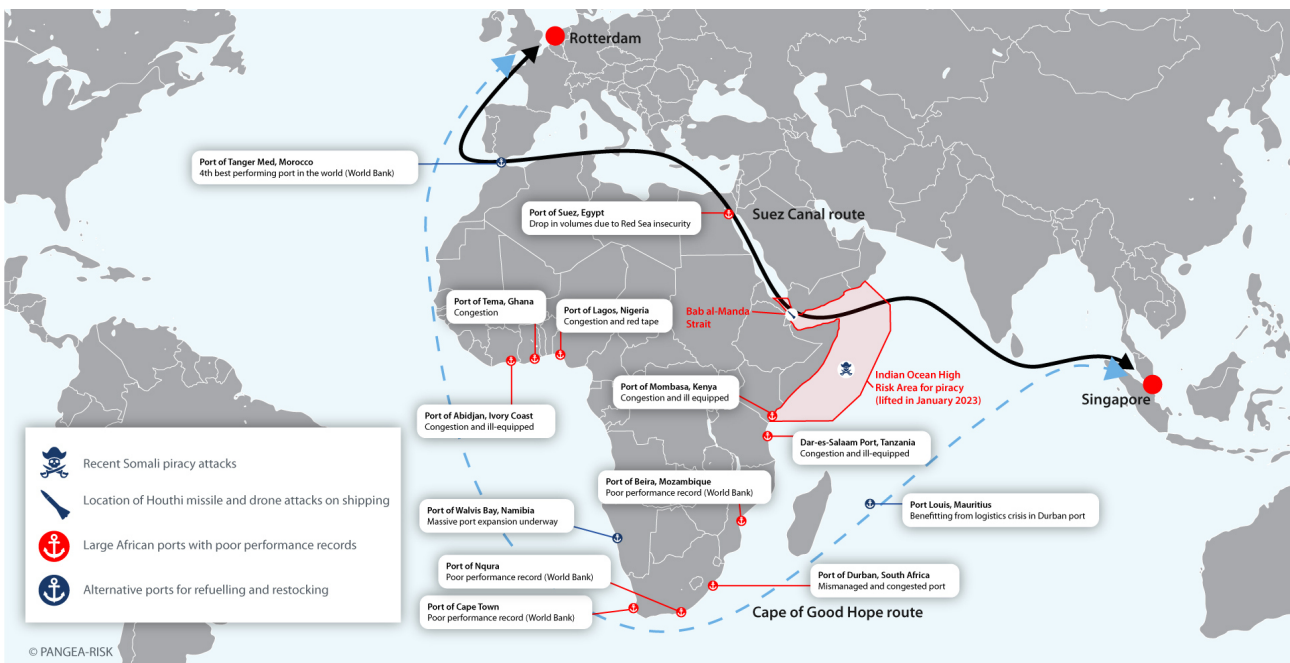
### SHIPS IN SUEZ CANAL





Furthermore, the sector in Africa is poised to encounter heightened competition from countries such as Australia, Canada, and the US. Unlike in Africa, these developed economies generally boast superior infrastructure, considerably enhancing their capacity to extract and process minerals efficiently. Another major obstacle in Africa is the limited ability to process and extract minerals due to insufficient funding for mining projects. Additionally, Africa's global competitors, like Australia, benefit from domestic policies that are better aligned with the critical minerals strategies of international mining partners, facilitating increased supply chain coordination.

The US and the EU may succeed by engaging with countries that have not yet fully tapped their mineral resources, such as Côte d'Ivoire, Mozambique, and Namibia, which hold substantial deposits of rare earth elements and other critical minerals. This approach, coupled with technological investments and diplomatic efforts to build robust supply chain partnerships, could potentially reduce their current over-reliance on China. However, this success hinges on rapidly establishing extraction and processing facilities and navigating complex local regulations, which presents a considerable challenge.



**AFRICAN PORTS ARE UNPREPARED FOR RE-ROUTED RED SEA SHIPPING**



## MINING IN SAUDI ARABIA

### **The critical minerals opportunity in the Middle East**

With its vast, untapped resources, the Middle East holds clear advantages for supplying critical minerals. The region can leverage existing mining, processing, and logistics capabilities, initially developed for the fossil fuel industry, to manage critical resources. However, fully capitalising on the Middle East's mineral resources requires overcoming several hurdles. Attracting major international investment will necessitate competitive fiscal terms and predictable regulations to encourage private-sector participation.

With its access to technology and financing, Saudi Arabia is well-positioned to quickly overcome these challenges. However, other emerging regional producers, such as Iran, face more pronounced obstacles due to limited access to technology, investment, and international partnerships. Despite these challenges, Iran's resource-rich landscape, including critical minerals, presents a compelling opportunity, especially for potential partners like China that can provide the necessary support to develop these resources.





# INSIGHT

The table below uses PANGEA-Risk's assessment framework, which has been adapted to reflect the presence, intensity, and direct impact of each type of risk peril on operations and investments in the African and Middle East regions. It combines a real-world perspective with examples from specific countries, providing insights into how these risks can affect business environments in these regions.

Risks	Risk Score (0.0 - 10.0)	Risk Rating	Description	Example Countries (Africa & ME)
<b>Political Instability</b>	5.0	Elevated	Frequent government changes, military interventions, coups, and widespread protests often lead to an unstable policy environment and weak governance.	<b>DRC:</b> Frequent unrest and government instability affect cobalt and copper mining, which is essential for electronics and EV batteries. <b>Sudan:</b> Political transitions and conflicts disrupt gold mining, potentially affecting rare earth element exploration projects.
<b>Expropriation, Nationalisation, Confiscation &amp; Deprivation</b>	4.0	Elevated	There is an elevated risk of governments in resource-rich countries expropriating mining assets to secure greater national benefit, influenced by rising nationalistic and resource sovereignty sentiments.	<b>Zambia:</b> Threats of nationalisation and actual policy changes have created an unstable environment for copper, which is critical for electric infrastructure. <b>Zimbabwe:</b> Land and mineral nationalisation policies have severely impacted investor confidence in chromium and platinum mining.
<b>Contract Frustration &amp; Breach</b>	5.0	Elevated	The risk of contract frustration is significant due to potential political changes, regulatory unpredictability, and the challenges in enforcing agreements in jurisdictions with weaker legal frameworks.	<b>South Africa:</b> Issues around PGM and manganese mining agreements have led to operational disruptions, directly impacting global supply chains for automotive catalysts and batteries. <b>Mozambique:</b> Breaches in coal mining contracts affect the availability of coal used in steel production, indirectly influencing energy storage technologies.
<b>Taxation</b>	4.5	Elevated	High taxation and royalty rates can be implemented as countries seek to maximise revenues from natural resources, which can suddenly change with shifts in government policies or economic conditions.	<b>Tanzania:</b> Sudden increases in mining taxes and changing regulations impact lithium and graphite mining operations, which are pivotal for battery technology. <b>Ghana:</b> New tax regimes targeting gold mining can also affect bauxite mining, which is critical for aluminium used in various tech applications.
<b>Corruption &amp; Bribery</b>	6.0	High	Corruption remains a high risk in the mining sector, especially in regions with less transparent regulatory frameworks. Unethical practices and the need to comply with international anti-corruption laws can increase costs and complicate operations.	<b>Nigeria:</b> Corruption in the licensing and regulatory processes impedes the development of nascent rare earth and uranium mining, which are vital for nuclear energy and electronics. <b>Angola:</b> Corruption affects the diamond mining sector and the broader mining regulatory environment.
<b>Regulatory Burden</b>	5.0	Elevated	Regulatory risks, including sudden export bans or changes in mining codes, are elevated. These changes can severely impact the feasibility and profitability of mining projects.	<b>Morocco:</b> Heavy regulations and bureaucratic hurdles in phosphate mining delay projects crucial for agriculture technologies within bio-energy sectors. <b>Egypt:</b> Regulatory changes in gold mining affect broader mining sectors by setting precedents complicating operations.
<b>Strikes, Riots &amp; Civil Commotion</b>	5.0	Elevated	Labour strikes and riots stemming from social or economic grievances can impact business continuity.	<b>South Africa:</b> Regular strikes and riots in the platinum and rhodium mining sectors disrupt operations, impacting global pricing and availability for catalytic converters. <b>Guinea:</b> Civil unrest affects bauxite mining, which is crucial for aluminium production used in high-tech industries.
<b>Security Risk</b>	6.0	High	Incidents of terrorism, sabotage, and theft could require substantial security measures or create operating environment hurdles, especially in areas involving valuable commodities.	<b>Sahel region:</b> Ongoing security threats from militant groups disrupt gold mining operations, indirectly affecting investments in associated mineral mining (e.g., lithium). <b>Iraq:</b> Security risks in northern regions hinder potential developments in mineral sectors like sulphur and phosphate.
<b>Economic Volatility</b>	5.5	Elevated	Economic instability leading to rapid changes in currency value, inflation, investment risks	<b>Zimbabwe:</b> Hyperinflation and policy instability impact lithium mining operations. <b>Iran:</b> Economic sanctions and currency fluctuations complicate the mining and export of zinc and copper, essential for various 4IR applications.



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AFRICA & MIDDLE EAST FORECASTING

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