

Statistics on Critical Energy Transition Minerals by Country and Production Levels



ABSTRACT

The Southern African Development Community (SADC) region is significant to the global production of Critical Energy Transition Minerals (CETMs; hereinafter critical minerals), particularly in cobalt, copper, lithium, and other minerals essential for green energy technologies. The Democratic Republic of Congo (DRC) supplies over 60% of the world's cobalt, while South Africa holds 70% of platinum group minerals (PGMs) resources. Mozambique, Zambia, the DRC and Zimbabwe are key producers of graphite, copper, and lithium. However, the region faces challenges such as limited infrastructure and refining capacity, which prevent it from fully leveraging its mineral resources. As global demand for critical minerals grows, driven by electric vehicles (EVs) and renewable energy, the SADC region's role in the green economy expands. Key recommendations include: harmonising mining policies, streamlining licensing, investing in critical infrastructure, establishing research hubs for critical minerals, developing regional supply chains, and leveraging the Africa Continental Free Trade Area (AfCFTA) to enhance the region's role in global value chains

1. INTRODUCTION

The SADC region is rich in critical energy transition minerals, hosting resources of cobalt, copper, lithium, graphite, platinum group minerals (PGMs), and rare earth elements (REEs). Countries such as the DRC, Madagascar, Mozambique, South Africa, Zambia and Zimbabwe play an essential role in global supply. Despite this, the region faces challenges in fully leveraging its mineral wealth, including limited refining capacity, infrastructure constraints, and fluctuating commodity prices.

This policy brief provides an overview of critical minerals production and supply chain trends. It highlights the production capacities of key SADC member states and examines regional production trends, challenges, and opportunities for enhancing value addition. By

understanding the role of SADC in the global critical minerals landscape, policymakers and industry stakeholders can develop strategies to enhance sustainable mining practices through beneficiation and value-addition to promote regional economic growth and ensure Africa's competitiveness in the green energy transition.

2. CRITICAL ENERGY TRANSITION MINERALS PRODUCERS — OVERVIEW

Current production of many energy transition minerals is more geographically concentrated than that of oil or natural gas

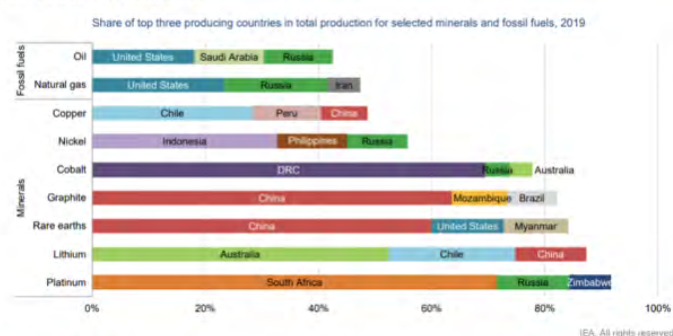


Figure 1: Production of critical energy transition minerals and fossil fuels globally.

The level of concentration is similarly high for processing operations, with China's significant presence across the board

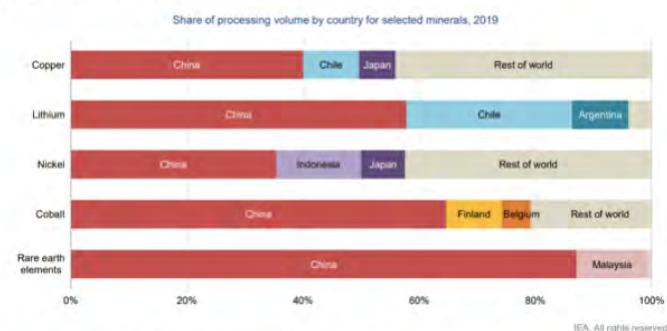


Figure 2: Global critical energy transition minerals processing hubs

The production of critical minerals is geographically concentrated, with a few countries dominating supply. The DRC accounts for over 60% of global cobalt production, making it the single largest supplier. South Africa holds more than 70% of the world's PGM reserves, reinforcing its global dominance in the sector. Zambia and the DRC are key copper producers in the SADC region, although Chile remains the

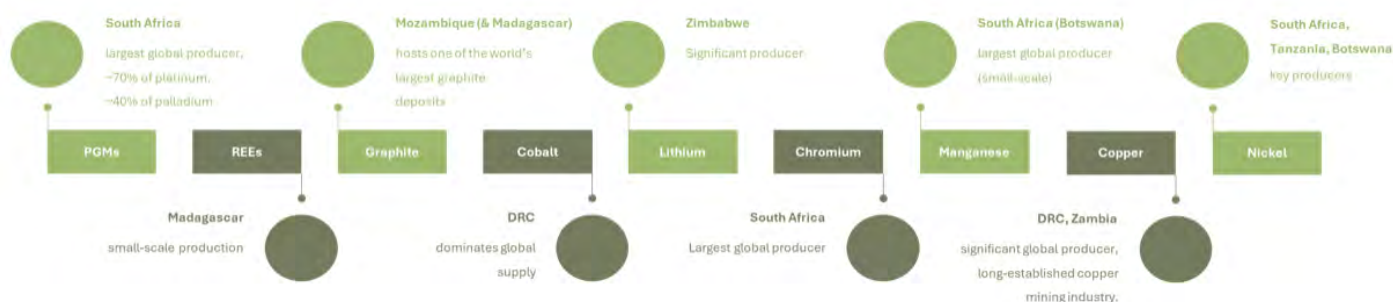


Figure 3: critical energy transition minerals produced in the SADC region.

world's top supplier.

Other critical minerals show similar patterns of concentration. China, Australia, and Chile control the bulk of lithium production, while China dominates graphite and REE production, refining over 80% of the world's REEs. Despite Mozambique's presence in graphite production and Zimbabwe's lithium reserves, SADC nations contribute only a fraction of total global output.

This geographic concentration presents supply chain risks, making diversification a priority for global markets. For SADC, this highlights the need to increase production, enhance refining capacity, and strengthen regional cooperation to capture more value within the global critical minerals supply chain.

3. CRITICAL ENERGY TRANSITION MINERALS PRODUCTION: SADC REGION

The SADC region hosts some of the world's largest resources of critical minerals. Such minerals produced in the SADC region include those highlighted in (Figure 3):

Understanding the production levels of these minerals by country is essential for informing policy development, particularly concerning sustainable resource management, industrialisation, and trade within the region.

4. PRODUCTION BY SADC MEMBER STATES

This section of the policy brief presents production statistics with a focus on the main SADC member states in critical minerals production.



DRC

Copper, Cobalt

The DRC is the largest producer of cobalt, with the country accounting for more than 60% of global supply (UN, 2024). Cobalt is primarily extracted in the southeastern provinces of Katanga and Lualaba. Due to the worldwide demand for EV batteries, the DRC's cobalt production has risen sharply in recent years. According to the UN Comtrade database, cobalt production in the DRC reached approximately 100,000 megatonnes (Mt) in 2023. Additionally, the DRC produces copper, with around 1.3Mt produced in 2023, making it the third largest copper producer globally.



Mozambique

Graphite, REEs

In the first half of 2023, Mozambique produced approximately 58,700Mt of graphite, with the Balama Mine (Syrah Resources) being the largest contributor. However, production declined sharply in 2024, with only 34,800Mt produced in the first half of the year (a 40% drop compared to the same period in 2023). By September 2024, output was 11% of the government's target and 55% lower than the previous year, primarily due to operational disruptions at major mines.

Mozambique is emerging as a significant producer of REEs, especially in Tete province. Although its REE production is relatively small compared to other minerals, its growth potential is considerable. In 2023, Mozambique produced approximately 3,000Mt of rare earth oxides, a 15% increase

from the previous year (Mozambique Ministry of Mineral Resources and Energy, 2024).



Zambia

Copper

Zambia is a major copper producer in SADC, contributing significantly to global copper supply. In 2023, Zambia produced around 850,000Mt of copper, primarily from the Copperbelt region. The country's copper industry is central to its economy, with Zambia being the second largest copper producer in Africa (African Mining Indaba, 2024). Copper is essential for renewable energy technologies and electrical infrastructure. Despite facing challenges such as fluctuating global copper prices and energy shortages, Zambia continues to be a major global supplier.



South Africa

PGMs, Manganese, Chromium

South Africa is the world's largest producer of platinum, with 130,000 kilograms produced in 2023 (SA DMRE, 2024). The country also produces significant quantities of manganese and chromium, which are critical for steel production. In 2023, South Africa's manganese production amounted to 5.5 million metric tonnes (MMT), accounting for approximately 30% of global supply (SA Minerals Council, 2024). In addition, South Africa produced an estimated 18MMT of chromium in 2023, maintaining its position as the leading global producer (US Geological Survey, 2024).



Zimbabwe

Lithium

Zimbabwe is a leading producer of lithium in Africa, with the country holding one of the largest reserves of this mineral globally. In 2023, Zimbabwe's lithium production reached 1,500Mt of lithium content (Zimbabwe Ministry of Mines and Mining Development, 2024). The country's lithium is essential to produce batteries, particularly for EVs, and the demand for Zimbabwe's lithium is expected to rise as global interest in EVs and energy storage solutions increases.



Madagascar

Nickel, Cobalt, Graphite

Madagascar is a notable producer of nickel and cobalt, primarily through the Ambatovy mining project. In 2023, the country produced an estimated 4,000Mt of cobalt, reflecting a slight increase from the previous year (Statista, 2024). The Ambatovy project, one of the world's largest lateritic nickel mines, has an annual production capacity of 60,000Mt of nickel and 5,300Mt of cobalt (AfDB, 2024). However, operational challenges have affected output, with production dropping to approximately 10,000Mt of nickel between April and September 2024, half of the volume produced during the same period in the previous year (Reuters, 2024).

Regarding REEs, Madagascar's production has declined significantly. In 2023, the country extracted approximately 960Mt of REEs, a sharp decline from 6,800 Mt in 2021 (Investing News, 2024). This reduction is largely attributed to increased opposition from local communities due to environmental and social concerns related to REE mining (Investing News, 2024).



Tanzania

Graphite

Tanzania currently produces graphite and small amounts of other critical minerals, with significant projects underway to expand its role in the global supply chain. In 2023, the country produced approximately 13,000Mt of graphite, primarily from the Epanko and Mahenge Graphite Projects, which are expected to ramp up production in the coming years (Trade.gov, 2024). Tanzania is considered to host one of the largest graphite reserves in Africa, with high-quality deposits suitable for battery anode production.



Botswana

Copper, Manganese

Botswana currently produces copper and manganese, though at relatively modest levels compared to regional producers. In 2023, Botswana's copper production reached approximately 30,000 Mt, primarily from mines in the Kalahari Copper Belt (Botswana Chamber of Mines, 2024).

Although manganese is not yet produced commercially, the recently licensed manganese mining project at K.Hill in southeastern Botswana is projected to yield approximately 80,000Mt annually upon commencement, marking Botswana's imminent emergence as a significant manganese supplier (Reuters, 2024). These critical minerals are increasingly important to the green economy, particularly in renewable energy and EV sectors.



Malawi

REEs

Malawi currently does not produce critical minerals at a commercial scale but is set to become a significant supplier of niobium and other REEs in the near future. The Kanyika Niobium Project, managed by Globe Metals & Mining, is expected to produce an average of 3,267Mt of niobium pentoxide annually, along with approximately 136Mt of tantalum pentoxide (Mining Weekly, 2024). While production has not yet commenced, the project is expected to significantly enhance Malawi's contribution to the global niobium market once operational.

The country is also developing its REE production through the Kangankunde Rare Earths Project, owned by Lindian Resources, which is scheduled to begin production in the fourth quarter of 2025. Once in operation, the project is expected to produce approximately 15,300Mt of premium rare earth concentrate per year, containing about 8,400Mt of rare earth oxides and 1,640 Mt of neodymium and praseodymium oxides (Mining Technology, 2024)



Angola

REEs

Angola does not currently produce REEs at a commercial scale, but significant exploration efforts are underway to establish it as a key supplier in the coming years. The country is home to the Longonjo project, operated by Pensana Rare Earths, which is set to become Africa's first large-scale neodymium and praseodymium (NdPr) mine. Once operational, the project aims to produce

approximately 38,000Mt of mixed rare earth sulfate annually, potentially supplying around 5% of global demand (Ecofin Agency, 2024). The Angolan government has identified several areas rich in REE deposits, including Benguela, Huambo, Lunda Norte, and Malanje, covering extensive exploration zones (MIREMPET, 2024).

In 2020, Namibia's Tschudi open pit mine produced 15,741 metric tonnes (t) of copper cathode, an increase from 14,940t in 2019 (US Geological Survey, 2023). The Tsumeb smelter processed 231,890t of complex copper concentrate, yielding 46,792t of blister copper in 2020, up from 45,953t in 2019 (U.S. Geological Survey, 2023).



Namibia

Copper,
Lithium, REEs

Namibia is also advancing in lithium production. In 2020, Lepidico Ltd. of Australia continued exploration of the Karibib Lithium Project. A definitive feasibility study released in May 2020 reported a mineral reserve estimate of 6.7 million tonnes (Mt) at grades of 0.46% lithium oxide, 0.23% rubidium, and 320 parts per million of cesium. The study proposed a chemical conversion plant with an estimated production capacity of 7,000t per year of lithium carbonate equivalent and 4,900 t per year of battery-grade lithium hydroxide monohydrate.

In the realm of REEs, Namibia is making significant progress. The Lofdal Heavy Rare Earths Project, a joint venture between Namibia Critical Metals Inc. and the Japan Organization for Metals and Energy Security (JOGMEC), is advancing under a 25-year mining license. The project is expected to produce approximately 2,000t per year of total rare earth oxides (TREO), including 117t of dysprosium and 17.5t of terbium (Namibia Critical Metals Inc., 2024).

5. REGIONAL PRODUCTION TRENDS

Increasing Demand and Global Shifts

The global demand for critical minerals has surged in recent years, driven by the expansion of green technologies and the rapid growth of the EV market. The SADC region has capitalised on this demand, with production levels of critical minerals such as cobalt, copper, and lithium continuing to rise. For instance, in 2023, global cobalt demand increased by 15%, with a significant portion of the supply sourced from the DRC (UN Comtrade, 2024). As a result, the SADC region's position in the global critical minerals market is becoming increasingly important, as it is home to the largest reserves of several essential minerals.

Diversification of the Mining Sector

While mining remains a key contributor to the SADC region's economy, there is a growing push toward diversifying the mining sector to add value to these raw materials locally. Several countries, including South Africa, Zambia, and Zimbabwe, are beginning to explore options for downstream processing and manufacturing to boost the economic impact of critical minerals production. This shift is aimed at reducing reliance on raw material exports and enhancing industrial capabilities within the region.

Challenges in Infrastructure and Market Volatility

Despite its significant critical minerals production, the SADC region faces severe challenges in infrastructure, technology, and market volatility, which hinder its ability to fully capitalise on its mineral wealth. Fluctuating commodity prices, political instability (particularly in the DRC), and limited refining capacity reduce the region's ability to optimise production. To retain more value, SADC nations must invest in refining and processing infrastructure, especially for cobalt, copper, graphite and lithium. Regional cooperation is essential to tackle shared risks and stabilise production. Governments should encourage the diversification of the sector through

manufacturing and value addition. Addressing these issues will enhance SADC's role in the global critical minerals market while fostering sustainable economic growth.

6. POLICY RECOMENDATIONS

Policy recommendations include:

Mining policies should be harmonised, ensuring consistency across SADC member states.

Licensing and permitting processes must be improved to facilitate timely development of projects.

Invest in critical infrastructure (transport logistics, water, energy and ICT) to support growth in value chains.

Establish regional mining research hubs or centres of excellence in partnership with universities, industry and state research facilities focusing on critical energy transition minerals.

Develop regional supply chains for local manufacturing and economic benefits, including integration into global value chains.

The African Continental Free Trade Area (AfCFTA) provides an opportunity for continental trade and strengthens Africa's bargaining position in global supply chains for EVs and battery production.

“Mining policies should be harmonised, ensuring consistency across SADC member states.”

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SARW

Southern Africa Resource Watch