Key Actors in Critical Energy Transition Minerals Value Chains: from Miners to Key Initiatives

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ABSRACT

The Southern African Development Community (SADC) region plays a crucial role in global Critical Energy Transition Minerals (CETMs; hereinafter critical minerals) value chains, supplying essential materials for green technologies and the energy transition. This policy brief analyses key actors in the region's mineral sector, including governments, investors, financial institutions, and mining companies, and assesses their roles in exploration, processing, and beneficiation. While the region excels in upstream activities, challenges in beneficiation and manufacturing hinder industrial growth. Regional and international initiatives exist to support value chain development, but targeted policy actions are needed to enhance beneficiation, attract investment, and promote local value addition. Recommendations focus on stakeholder collaboration, small and medium enterprise (SME) development, environment, social and governance (ESG) compliance, and local content policies to drive sustainability, technological advancement, and economic growth in the green minerals sector.

1. INTRODUCTION

The SADC region has the potential to play a crucial role in global critical minerals value chains, supplying essential materials for green technologies and the green energy transition. From miners and processing facilities to policymakers and international initiatives, a diverse set of actors shape the development, sustainability, and competitiveness of these value chains. Understanding their roles, interactions, and influence is vital for enhancing regional beneficiation, attracting investment, and ensuring strategic positioning in global markets.
This policy brief explores the key actors in the SADC mineral sector (including critical minerals), assessing their contributions and the policy frameworks that can strengthen regional participation in the green energy economy.

2. MAPPING KEY ACTORS

The growth of the green energy sector and the development of critical minerals involves a global integration of key players. (Figure 1) provides a global overview of dominantly participating countries for specific critical energy transition minerals and green technologies. From (Figure 1), it is evident that only a few global actors are present across multiple commodities and their respective value chains. These actors include China, the United States of America (USA), Chile, Korea, and the European Union (EU) in rank of activity across mineral value chains which contribute to clean technologies. It is also notable that China is the only actor that participates from mining and processing of critical minerals, all the way to deployment and use of clean technologies. Chile is largely focussed on activities such as mining and processing, whereas the USA and EU participate as the market for end products or clean technologies.
There are several actors and initiatives in the SADC critical minerals sector. Whilst most of the actors support the mineral sector as a whole, their initiatives and focus areas generally align with global and market demands at the time (such as green energy and digitalisation minerals at present).

a) Governments and Ministries of Mining and Energy

Refer to (Table 1) for key actors representing governments and ministries of mining and energy in the SADC region.

Role: Governments and mining ministries play a central role in governing and regulating the mineral sector by setting national policies and frameworks for responsible exploration, extraction, and sustainable mineral use. They attract investment, oversee infrastructure development, and regulate mineral supply and exports to ensure market stability. Through SADC, they collaborate on policy harmonisation, best practice sharing, and cross-border resource management. In addition, they support research, innovation,

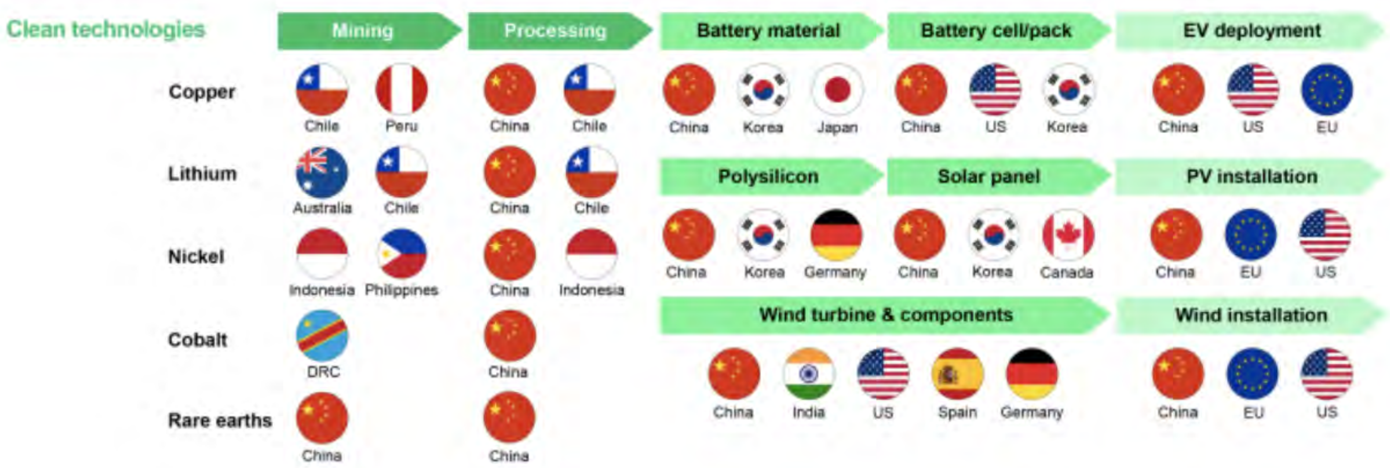

Figure 1: Key actors at global level, participating at each part of the respective critical minerals value chains (IEA).

and recycling efforts to reduce reliance on primary resources while enforcing environmental and social safeguards. By investing in skills development and local expertise, they drive sustainable mineral management, regional cooperation, and economic growth.

b) Development and Finance Institutions

Refer to (Table 1) for key actors representing development and finance institutions in the SADC region.

Role: Development and finance institutions play a critical role in sustainable mineral management in the SADC region by providing financial resources, risk mitigation, and capacity building. They fund mineral exploration, extraction, processing, and infrastructure projects while attracting public and private investment. Through financial instruments such as loans, guarantees, and insurance, they reduce project risks and promote private sector involvement. Additionally, they support responsible mining practices, capacity-building initiatives, regional cooperation, policy development, and research in green technologies to enhance sustainability and efficiency.

c) International Partners

Refer to (Table 1) for key actors representing international partners to the SADC region.

Role: International partners play a crucial role in strengthening mineral value chains in the SADC region by providing funding, technical expertise, regulatory support, and capacity-building. Their contributions focus on policy development, infrastructure enhancement, and promoting sustainable mining practices in collaboration with governments and private entities.

d) Investors

Refer to (Table 1) for key actors representing investors in the SADC region.

Role: investors provide capital, technology, and market access to critical mineral projects in SADC, enabling exploration, mining, processing, and refining.

e) Educational Institutions and Research Bodies

Refer to (Table 1) for key actors representing institutions and research bodies in the SADC region.

Role: Educational institutions and research bodies support the SADC mineral sector by advancing knowledge, providing technical expertise, and promoting sustainability. Their role includes conducting studies on extraction, recycling, and alternatives, analysing mineral deposits for resource management, aiding policy development, offering education and training, and assessing environmental and social impacts for sustainable practices.

f) Exploration, Mining and Extraction

Refer to (Table 1) for key actors representing exploration, mining and the extraction industry in the SADC region.

Role: Exploration, mining and extraction play a vital role in economic development, resource security, investment, and infrastructure growth. These initiatives create jobs, stimulate local economies, and generate export revenue while ensuring a steady supply of minerals for export and for industrial and technological advancements. These projects drive infrastructure development, including transport networks, processing facilities, and energy supply, attracting domestic and international investment to enhance global competitiveness. They foster regional cooperation within SADC through shared resources and cross-border initiatives, supporting broader economic integration.

g) Mineral Processing and Beneficiation

Refer to (Table 1) for key actors representing mineral processing and beneficiation in the SADC region.

Role: Mineral processing and beneficiation adds value to critical raw materials (CRMs) by transforming them into higher-value products, enhancing industrial capacity and economic growth in the SADC region. It creates jobs (including skilled and unskilled labour), stimulates local economies, and reduces reliance on raw material exports, strengthening economic resilience. Processing and beneficiation attract local and international investment, driving industrial expansion and infrastructure development. Advanced processing technologies improve resource efficiency, minimise waste, and support sustainable mining practices.

h) End-Product Manufacturers (Value Addition and Product Development)

Refer to (Table 1) for examples of end-product manufacturers in the SADC region.

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Table 1: Key actors participating in the mineral sector.

Actors	SUPPORTING ACTORS TO THE MINING INDUSTRY						EXTRACTION TO VALUE ADDITION		
	Governments and Ministries of Mining and Energy	Development and Finance Institutions	International Partners	Investors	Institutions and Research Bodies	ESG, Sustainability, & Civil Society	Exploration, Mining and Extraction	Mineral Processing and Beneficiation	End-Product Manufacturers
Ministries of Mining, Energy and Natural Resources	X								
African Development Bank – Funds infrastructure, economic growth, mining, and energy projects. Research on sustainable mining for Africa's industrial and energy needs.		X			X				
African Export-Import Bank – Focuses on trade and export financing.		X							
Botswana Development Corporation – Finances industrial and infrastructure projects in Botswana.		X							
Development Bank of Southern Africa – Supports infrastructure and value chain development.		X							
Development Finance Corporation (US) – Invests in African development and infrastructure.		X							
Eastern & Southern African Trade & Development Bank – Finances trade and development projects.		X							
Export Credit Insurance Corporation (South Africa) – Provides export credit insurance.		X							
Industrial Development Corporation (South Africa) – Supports industrial growth and job creation.		X							
Lesotho National Development Corporation – Funds industrial development in Lesotho.		X							
Mauritius Development Investment Authority – Facilitates investment and development financing.		X							
SADC Development Fund – Finances regional development initiatives.		X							
Seychelles Development Finance Corporation – Supports local development projects.		X							
Southern African Trust – Funds poverty reduction initiatives.		X							
Tanzania Investment Bank – Finances development projects.		X							

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Zambia Development Agency – Supports investment and economic growth.		X							
Zimbabwe Development Bank – Finances industrial and economic development.		X							
EIB: Finances cobalt, lithium, and rare earth mining.			X						
EU: Secures CRM supply chains via the Critical Raw Materials Act.			X						
IFC: Invests in private-sector CRM projects with responsible extraction.			X						
Nordea Bank: Finances CRM mining with a focus on sustainability.			X						
US: Secures CRM supply through the Minerals Security Partnership.			X						
World Bank: Supports CRM projects with funding and technical aid.			X						
Anglo American Platinum – Focuses on PGMs (South Africa) and cobalt (Zimbabwe). Refines PGMs for catalytic converters, electronics, and industrial use. Invests in copper & PGMs, prioritising sustainability.				X			X	X	
BASF (South Africa): Specialises in cobalt, lithium, and REE processing.				X			X	X	
Glencore – Operates copper and cobalt refineries in Zambia and DRC. Leading investor in cobalt & copper in DRC & Zambia.				X			X	X	
Barrick Gold (Tanzania, DRC): Focuses on responsible gold & copper mining. Gold mining with cobalt extraction links.				X			X		
Caterpillar Inc.: Supplies mining equipment for copper, cobalt, lithium and platinum projects.				X			X		
China Nonferrous Metal Mining Group: Invests in copper and cobalt (Zambia, DRC).				X			X		

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Rio Tinto: Invests in lithium & REEs in Southern Africa.				X			X		
Tesla: Secures lithium, cobalt & nickel for EVs, including from SA.				X					X
BHP: Invests in nickel, copper & cobalt for EVs, with SA operations.				X					
China: Major investor in cobalt & REEs in DRC & Zambia.				X					
CNOOC: Invests in cobalt & copper in Zambia & DRC.				X					
Exxaro: Invests in graphite & lithium for energy storage.				X					
Freeport-McMoRan: Mines copper & cobalt for EVs, mainly in DRC.				X					
Norilsk Nickel: Focuses on nickel for EVs, with SA operations.				X					
Sumitomo: Mines copper & nickel in Southern Africa.				X					
Volkswagen: Sources lithium & cobalt for EVs.				X					
Tanzania Minerals & Mining Research Institute – Research REEs, graphite, and CRMs. Develops processing technology for graphite and REEs. Develops sustainable mining techniques for CRMs.					X		X	X	
University of the Witwatersrand – Research mining, mineral processing, and resource development. Research PGM, REE, and CRM processing.					X			X	
African Minerals & Geosciences Centre (Tanzania) – Focuses on geology and sustainable CRM extraction, including rare earths and base metals.					X				
African Minerals Development Centre – Provides policy support and technical expertise across Africa.					X				

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Council for Geoscience (South Africa) – Provides geological mapping and exploration data.					X				
CSIR – Innovates mining technologies and sustainable practices.					X				
Geological Society of South Africa – Research energy transition minerals like lithium and cobalt.					X				
Geological Surveys (Botswana & Namibia) – Conduct mineral assessments and CRM exploration.					X				
Minerals Council South Africa – Advocates for policy stability, investment, safety, and ESG compliance.					X				
Mining Industry Association of Southern Africa (Chamber of mines)					X				
Mintek – Specialises in mineral processing and beneficiation technologies.					X				
Namibian Uranium Institute – Research sustainable uranium mining.					X				
National Institute for Mining Research (Mozambique) – Studies mining technologies, including graphite and REEs.					X				
Research Institute for Development (Comoros) – Focuses on resource development and processing.					X				
SADC (Industrialisation Unit) – Supports policy and industrialisation initiatives for green minerals.					X				
Southern African Institute of Mining & Metallurgy – Promotes research and knowledge sharing.					X				
University of Pretoria (Mining Engineering) – Research sustainable mineral extraction and resource efficiency.					X				
University of Zambia & Copperbelt University – Conduct mining and mineral processing research.					X				

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University of Zimbabwe (Institute of Mining Research) – Focuses on platinum and chrome beneficiation.					X				
Community development organisations – Groups ensuring local benefits from mining projects.						X			
Environmental NGOs & Watchdogs – Advocacy groups monitoring mining impacts (e.g., SARW, Mining Affected Communities United in Action).						X			
Sustainable Mining Standards & Certifiers – Entities promoting responsible sourcing (e.g., IRMA, ICMM, RMI).						X			
First Quantum Minerals – Processes copper, cobalt, and nickel in Zambia and DRC.							X	X	
Jinchuan Group – Extracts and refines cobalt, copper, and nickel in DRC and Zambia.							X	X	
Palabora Mining Company (South Africa) - Produces copper and molybdenum.							X	X	
Sable Zinc – Processes zinc and cobalt in Zambia.							X	X	
Zambia Consolidated Copper Mines – Refines copper at Konkola and other Zambian smelters.							X	X	
Africa Minerals and Geosciences Centre (Tanzania): Supports CRM exploration in East Africa.							X		
African Mining Group: Mines REEs, cobalt, and manganese in Southern Africa.							X		
Ivanhoe Mines: Copper mining (DRC, South Africa).							X		
Molybdenum Company of China: Mines copper and molybdenum in Zambia.							X		
Namibia Critical Metals: Specializes in REE exploration.							X		

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African Rainbow Minerals – Processes manganese and PGMs in South Africa, producing ferroalloys and refined metals.								X	
Ariab Mining – Extracts and refines gold and copper in Sudan for regional markets.								X	
China Minmetals – Refines copper, cobalt, and manganese in Zambia and DRC.								X	
Impala Platinum – Refines platinum and palladium in South Africa.								X	
Rand Refinery – Refines gold, silver, and PGMs in South Africa for global supply.								X	
Tanzania Mining Corporation – Refines gold and base metals in Tanzania.								X	
BMW Group (SA): Produces EVs and supports the battery supply chain.									X
Sappi Group (SA): Develops renewable energy products and green materials.									X
Solarworld Africa (SA): Manufactures solar panels for renewable energy.									X

3. KEY INITIATIVES

Various initiatives within the SADC region aim to enhance critical energy transition minerals value chains. These initiatives include, but are not limited to: -

The African Mining Vision: A strategic initiative by the African Union (AU) to ensure that mineral resources contribute to sustainable development.

SADC Industrialisation Strategy and Roadmap (2015-2063): A SADC framework promoting value addition, regional beneficiation, and industrial linkages.

EU-SADC Partnership on Critical Minerals: A collaboration between the European Union (EU) and SADC focusing on developing sustainable and transparent supply chains for CRMs and critical energy transition minerals.

Battery Value Chain Initiatives: Led by the SADC, African Development Bank (AfDB), and private sector stakeholders to develop lithium-ion battery manufacturing capacity in SADC to support EV and energy storage industries.

Regional Resource Governance Initiatives: Programs led by entities such as the Extractive Industries Transparency Initiative (EITI) and SADC Mining Governance Framework, to promote responsible mining practices.

4. POLICY RECOMMENDATIONS

Policy recommendations include:

Coordination and cooperation of all stakeholders participating in the critical minerals sector in the SADC region.

Support small and medium-scale enterprises along the value chain (improve ESG compliance, safety, and market integration).

Support SMEs in processing, assembling and manufacturing.

Fund start-ups focused on downstream activities, circular economy solutions and mineral recycling to drive sustainability and technological advancement in the critical minerals sector.

Develop local content policies and strategies along the critical minerals value chain.

Enforce local content and value addition policies.

SARW

Southern Africa Resource Watch