From Minerals to Manufacturing

Minerals value addition in Tanzania perspective

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Tanzania's mineral sector is vital to its economy, contributing 9.1 percent to GDP in 2023 and 10.1 percent in 2024, surpassing the government's 2025 target. Notably, minerals alone account for more than half of the country's non-traditional exports.[1] Moreover, the mineral sector employs over 6 million people in production and related services. To further foster growth along the mining value chain, the Government of Tanzania has developed the forthcoming Tanzania Critical and Strategic Minerals Strategy, which emphasises beneficiation and local value addition. As part of the strategy, the government has identified 25 critical and 18 strategic minerals that could significantly contribute to the growth of the country's economy.

Tanzania is strategically positioned as a key player in the global energy transition due to its substantial reserves of three critical minerals: graphite (C), praseodymium (Pr), and neodymium (Nd). The country holds 6 percent of the world's graphite reserves, a vital component for producing anodes in lithium-ion batteries, which are essential for energy storage solutions and electric mobility.[2] Additionally, Nd-Pr metals are indispensable for manufacturing high-performance magnets used in electric vehicle (EV) motors and wind turbines, both of which are pivotal technologies in the shift towards a low-carbon economy.

As the global energy transition accelerates, the demand for these critical materials is expected to grow significantly. Simultaneously, countries are prioritising the diversification of their supply chains to mitigate risks and ensure a stable supply of essential minerals. This dual trend of rising demand and the push for supply chain diversification presents a unique opportunity for Tanzania to establish itself as a reliable and relevant supplier in the global market, supporting the energy transition while strengthening its economic and strategic standing.

Tanzania is already taking steps to capitalise on this opportunity. The country has several large-scale graphite and rare earth element (REE) mining projects in development. These projects include the Mahange and Epanko graphite mines, which are set to produce more than 60,000 tonnes each, and the Ngualla Rare Earths Project, which is projected to produce 37,000 tonnes of REE metals annually.[3]

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1 Tanzania Mining and Investment Conference Report, Ministry of Minerals, Tanzania, 2024, https://conference.madini.go.tz.

2 Rare Earths Annual Report, USGS, 2024, https://pubs.usgs.gov/periodicals/mcs2024/mcs2024-rare-earths.pdf.

3 Expert interviews.

To de-risk global supply chains, it is essential not only to diversify the sourcing of raw materials but also to expand the production of key intermediate products. Currently, China dominates the market, producing over 90 percent of the world's spherical graphite and 70 percent of REE metals.[4] With its abundant reserves and competitive energy costs, Tanzania is well-positioned to develop vertically integrated production capabilities for spherical graphite and REE metals, offering a competitive alternative to Chinese and other regional suppliers. However, to realise this potential, local mining operations will need to be scaled up. As a result, the opportunity to establish value-added production is likely to materialise only in the medium term, within the next three to seven years.

While critical minerals in and of themselves represent a significant opportunity for Tanzania, this report aims to explore mineral value addition opportunities in the country. Building on Tanzania's Critical and Strategic Minerals Strategy, this report has identified a subset of minerals that offer economically viable opportunities for intermediate and end-use product manufacturing in Tanzania in the short to long term.

Using a "push-pull" approach, 11 out of the 25 critical and 18 strategic minerals were shortlisted. The "push" approach prioritised the minerals based on current and planned annual production[5], while the "pull" approach prioritised minerals with high regional demand measured by the current value of imports of intermediate or end-use products made from these minerals. Overlaying the two approaches revealed 11 minerals – six critical minerals (graphite, REEs, nickel, iron, copper and cobalt) and five strategic minerals (gold, limestone, phosphate, potash and synergistic minerals) – as having the highest potential for value addition.[6]

For the 11 prioritised minerals, 14 value addition opportunities have been identified, with the potential to generate an estimated annual value of $7.2 billion to $11.7 billion for Tanzania. These opportunities include intermediate and end-use products that can be produced from the prioritised minerals and demonstrate strong viability.[7] The viability was evaluated using ten assessment criteria, including factors such as the scale of regional demand, scale of existing supply, competitive landscape, availability of inputs and capabilities, and the conduciveness of the policy and regulatory environment. Examples of value addition opportunities include gold bars and jewellery, cement and ceramics derived from limestone, as well as spherical

[4] Rare Earths Annual Report, USGS, 2024, https://pubs.usgs.gov/periodicals/mcs2024/mcs2024-rare-earths.pdf; Graphite Annual Report, USGS, 2024, https://pubs.usgs.gov/periodicals/mcs2024/mcs2024-graphite.pdf.

[5] Planned production considers annual output volumes of all projects that are announced by 2032.

[6] Synergistic minerals are typically used together in silica, dolomite, gypsum, feldspar, kaolin, pozzolana and clay.

[7] Intermediate products are those that require additional processing or serve as input materials, while end-use products are finished goods ready for consumption or use.

graphite used in anode material production. Gold jewellery and bars are expected to remain the largest contributors to value addition, with an estimated potential of $4.0 billion to $7.4 billion annually. Meanwhile, non-gold value-addition opportunities are projected to contribute an additional $3.2 billion to $4.3 billion annually.

In the short term, opportunities primarily involve strategic minerals used in jewellery, cement, ceramics, glass, and paper and pulp products, with a combined annual value potential of between $1.8 billion and $2.5 billion. In the medium term, the opportunities linked to critical minerals, such as REE metals, spherical graphite, nickel and cobalt sulphate/metal, emerge. At the same time, additional opportunities linked to strategic minerals, such as nitrogen, phosphorus and potassium fertilisers (NPK) and diammonium phosphate (DAP) fertiliser, gold bars, finished steel products, and copper cathode/wire become viable. Jointly, these opportunities have an estimated value of $5.4 billion to $9.2 billion annually. In the long term, Tanzania could unlock further mineral value addition opportunities, subject to favourable market dynamics and scaled production of required minerals.

The 14 value addition opportunities can be further categorised into four distinct categories based on their ease of implementation and potential for global competitiveness:

- **Low-hanging fruit.** The production of cement, ceramics, glass, paper, and pulp from strategic minerals – all of which have growing local and regional demand – is a key near-term value addition opportunity. Local production can be implemented relatively easily, either through greenfield projects or by growing existing ventures, while scaling the production of primary input minerals. Pursuing these opportunities could enable Tanzania to achieve self-sufficiency and address unmet regional demand valued at $800 million to $1 billion annually. Demonstrating early success could build momentum and boost confidence for future, larger-scale investments.
- **No-regret opportunities.** The production of gold bars and jewellery could generate between $4 billion and $7.5 billion annually. Tanzania can quickly pursue these opportunities due to its existing high mineral production levels and expanding local refining activities. However, relative to the low-hanging fruit, the ease of implementation is slightly lower due to higher capabilities required for jewellery production and the need to obtain London Bullion Market Association (LBMA) certification for gold bar production.
- **Big bets.** Spherical graphite and Nd-Pr metals represent opportunities that are important for the global energy transition, including applications in EVs, wind turbines and high-tech manufacturing. Tanzania has large, high-quality graphite reserves, and planned projects are anticipated to make the country a top-five global producer by 2028. The country also has vast reserves of REE metals with extraction anticipated in 2025. Establishing spherical graphite and rare earth

element (REE) value addition in Tanzania will require substantial financing, access to intellectual property (IP), and collaboration with existing industries – or, where such industries do not exist, the development of complementary sectors.[8] Thus, partnerships with global players as well as neighbouring countries would be key to unlock these downstream opportunities worth $700 million to $1.1 billion annually.

- **Opportunistic plays.** The production of cobalt and nickel sulphate/metal, NPK and DAP fertilisers, and steel and copper cathode/wire could generate between $1.6 billion and $2 billion in value annually. The feasibility of these opportunities, however, depends on evolving domestic supply positions and shifts in global market conditions, necessitating careful monitoring to ensure market entry only when conditions are favourable. For example, nickel and cobalt markets are oversupplied currently because of investment in Indonesia and the Democratic Republic of Congo, respectively, driving down prices. Upstream and value addition investments in these markets will only become economically viable once the oversupply issue is resolved.

Realising these 14 identified value addition opportunities could help Tanzania to achieve 9 percent to 15 percent GDP growth within seven years. This growth, in turn, could generate over $1 billion in annual tax revenue, providing a substantial boost to public finances. Additionally, value addition activities have the potential to create more than 25,000 direct jobs, even under conservative estimates, fostering employment and improving livelihoods.[9] Partnering with international public and private sector stakeholders could help attract critical investments, enable the transfer of advanced technologies and skills, and unlock future additional investment in adjacent industries.

To realise these opportunities, stakeholders can execute targeted actions in six key areas (see table below).

E1: Target actions to unlock value-added opportunities in Tanzania.

Action area	Challenge	Unlock
Availability of minerals	Small- and medium-scale miners and traders commit their output to global off-takers, often with a pre-financing commitment, which limits local availability of required minerals.	Develop an integrated minerals strategy that addresses the entire value chain, from exploration to beneficiation, to ensure a steady supply of minerals for domestic processing.

[8] For example, industries such as steel that can co-use required chemical waste management infrastructure.

[9] Economic estimates suggest that another 50,000 to 100,000 indirect jobs could be created.

Action area	Challenge	Unlock
Access to capital	Global investors struggle to navigate Tanzania's risk landscape, while local investors remain under-informed about opportunities in mineral value addition.	Improve access to financing through targeted initiatives to improve investment attractiveness (eg, reduced free-carried equity requirements, and lower capital costs) and mobilize funding (eg, regional financing coalitions, sovereign guarantees, and public-private partnerships).
Policy and regulation	Frequent policy shifts and a lack of clear incentives have hindered investor confidence and slowed capital mobilisation for local processing.	Establish a stable, evidence-based regulatory framework that fosters long-term investment, incentivises local production, and balances competitiveness with import substitution where feasible.
Skilled local or regional talent	Tanzania's workforce has a limited supply of the specialised technical skills required for large-scale mineral value addition, which limits the sector's growth potential.	Develop a comprehensive workforce plan to ensure local talent development is aligned with skillsets demanded in the future.
Partnerships with global technology players	Limited access to cutting-edge processing technologies constrains Tanzania's ability to move up the value chain in mineral beneficiation.	Establish partnerships with global technology firms through joint ventures, licensing agreements and targeted investor attraction initiatives to accelerate technology transfer and enhance competitiveness.
Improved rail, road and energy infrastructure	Inefficient supply chain channels and unreliable energy reduce Tanzania's ability to compete in mineral processing.	Focus on infrastructure investments in rail and road networks, especially connecting regions with high mining activity to major cities and ports, to improve logistics for value addition. Additionally, prioritise the development of cost-effective and reliable energy distribution systems to boost operational efficiency and reduce production costs.

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We also wish to acknowledge the invaluable contributions of various ministries and government agencies, including the Ministry of Industry and Trade, the Ministry of Finance, and the Tanzania Investment Centre, among others. Their collaboration and insights have been critical in ensuring the comprehensiveness and relevance of this report.

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Tanzania's minerals and mining sector

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Mining is a critical pillar of Tanzania's economy, employing over 6 million people in production and related services. The sector exceeded the 2025 target of a 10 percent contribution to the country's GDP in 2024, underscoring its economic importance.[10] Gold accounts for the largest share of mineral production, representing 80 percent of value ($3.6 billion in 2022), followed by coal at 6 percent ($210 million in 2022).[11] Tanzania's mineral extraction is driven by small-scale mines, with only ten medium-to-large-scale mines operating across the country. Today, an additional 13 medium-to-large-scale mining projects are in the pipeline across various minerals.

To foster growth in the mining sector, the Government of Tanzania has launched several initiatives, including developing a new strategy for critical and strategic minerals, updating policies and regulations, such as the Mining Regulation of 2020, and fostering government collaboration with relevant stakeholders to address challenges in mineral extraction and processing.[12] The government is also making concerted efforts to promote the inclusion of women and youth in the development of the mining sector through initiatives like "Mining for a Better Tomorrow (MBT)".

A key pillar of Tanzania's strategy is to unlock the untapped potential of its critical minerals, positioning the country as a key player in the global energy transition. In this regard, the government has identified 25 critical minerals, including graphite, copper, nickel, lithium, and cobalt – all of which are present in varying quantities across the country – that have potential for further development.

Graphite stands out as a particularly high-potential resource, with Tanzania ranking fifth globally in reserves. While current projects are largely in pre-production phases, the pipeline is set to produce over 300,000 tonnes of graphite within the next seven years, solidifying the country's role in the supply chain for lithium-ion batteries. Some projects, including the Nachu and Ruangwa graphite projects, are anticipated to commence mining in 2025, with planned production exceeding 50,000 tonnes. Tanzania is also home to substantial reserves of high-quality light REEs, which are essential for EVs and renewable energy technologies. Tanzania ranks among the

[10] "Tanzania's mining sector surpasses GDP target, hits 10.1 percent contribution," The Citizen, April 23, 2025. https://www.thecitizen.co.tz/tanzania/news/national/tanzania-s-mining-sector-surpasses-gdp-target-hits-10-1-percent-contribution-5014044#story.

[11] Tanzania Mining and Investment Conference, 2024.

[12] Tanzania Mining Regulation 2020; list reflects ongoing government initiative and not a judgement on the effectiveness of these.

top ten countries globally in REE reserves, with production anticipated to begin by 2026, solidifying its strategic significance.

While these reserves and the planned projects are putting Tanzania on track to become a key player in the global battery and energy component value chain, local value addition opportunities for these minerals are likely to emerge only in the medium term. The first projects coming online in 2025 and 2026 need to reach scale and be supplemented with other projects before economically viable value addition can be started.

Notably, only about 16 percent of Tanzania has been mapped using high-resolution airborne geophysical surveys, highlighting a significant opportunity for the discovery of deeper reserves and potentially a broader range of minerals.[13] The government aims to increase the mapping coverage to 50 percent by 2030, which could unlock additional mining and value addition opportunities.

[13] Ministry of Minerals expert Interview.

Minerals value addition in Tanzania

Minerals value addition in Tanzania

The minerals value chain typically has three steps: mining, beneficiation, and value addition; the latter can be further differentiated into intermediate product production and end-use production. Tanzania currently has a robust mining capacity, with beneficiation levels varying across different minerals. However, most minerals are exported, and only a relatively small share of minerals is retained in Tanzania for value addition. Given the significant opportunity to create additional growth, jobs, and tax revenues, the Government of Tanzania has made significant headway in developing a strategy for upstream and midstream activities.

This report aims to augment existing work by providing a detailed assessment of downstream opportunities and outlining the necessary steps to successfully capture these.

To identify value addition opportunities, there are three questions that need to be answered:

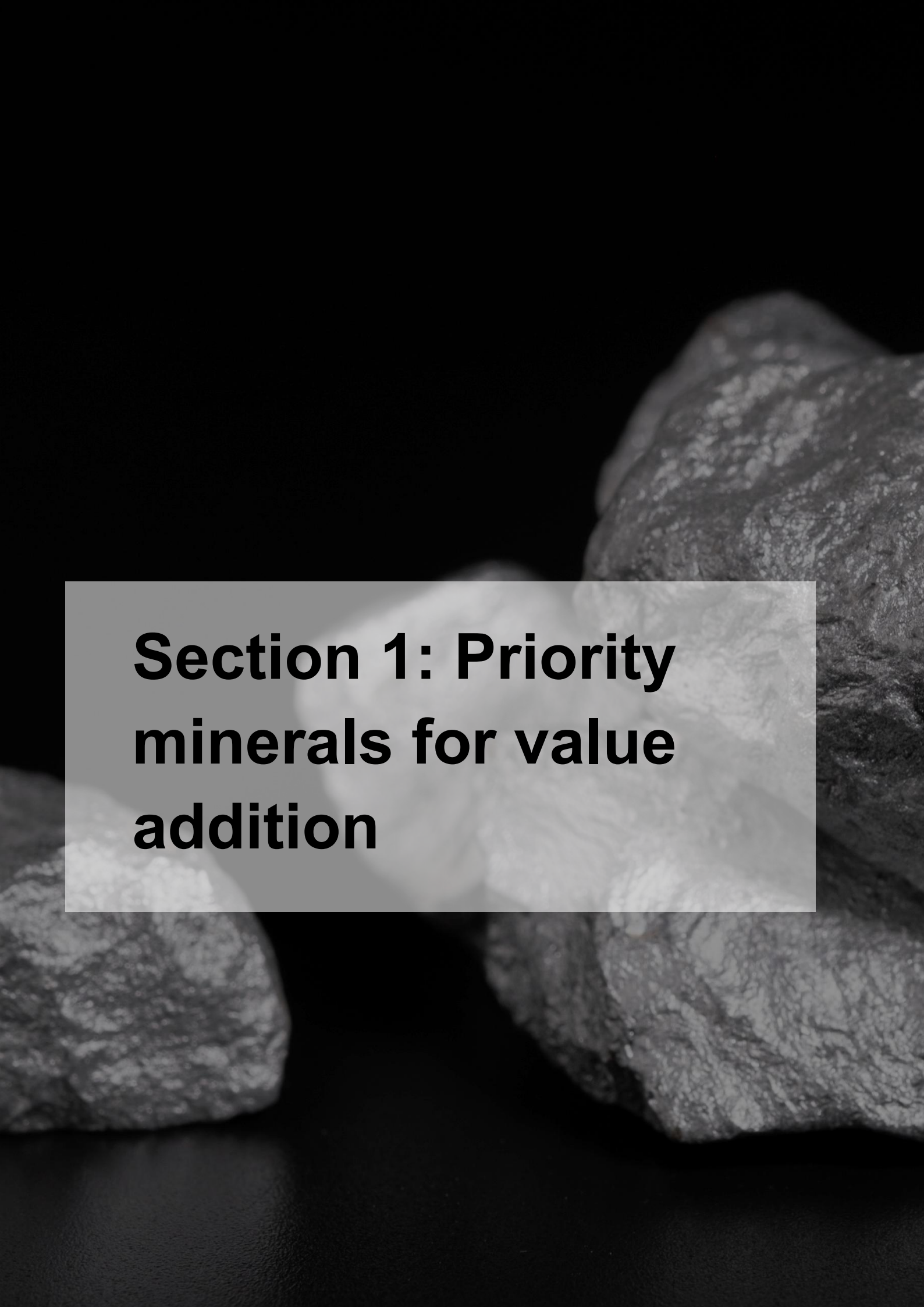
1. What are the critical and strategic minerals in Tanzania with significant potential for value addition?
2. What intermediate and end-user products linked to the prioritised critical and strategic minerals offer the greatest potential for competitiveness and economic impact in Tanzania?
3. What actions are required to unlock these opportunities?

The first question focuses on identifying the critical and strategic minerals with the highest potential for value addition. This involves analysing both current and planned mineral production and overlaying local and regional import data on related intermediate and end-use products.

The second question focuses on identifying intermediate and end-use products linked to these minerals and prioritising those that are feasible to produce with the greatest potential for economic impact. This is achieved by mapping each prioritised mineral to a comprehensive list of potential intermediate and end-use products, and then rigorously assessing these products against specific criteria, including market demand, competitive landscape, mineral concentration in the product, availability of required inputs, and the policy and regulatory environment. The outcome is a focused set of value addition opportunities, segmented across three time horizons:

- Horizon 1 (one to three years)
- Horizon 2 (three to seven years)
- Horizon 3 (beyond seven years)

The last question explores the key actions required to unlock these opportunities. The unlocks are categorised into four distinct groups, based on two key dimensions: complexity of implementation and potential for global competitiveness. For each category, tailored actions have been identified, including addressing raw material constraints, building enabling infrastructure, mobilising financing, securing technology partnerships, and strengthening policy to attract and retain investment.



Section 1: Priority minerals for value addition

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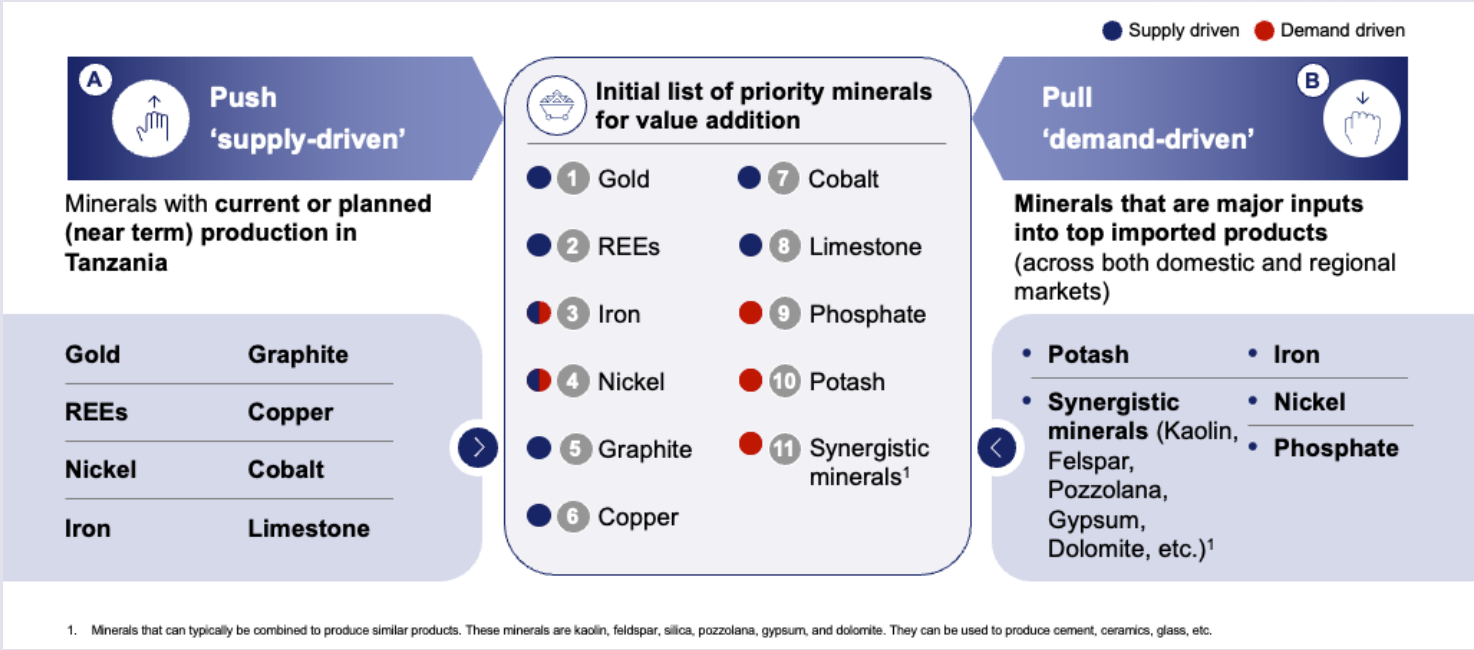
Eleven minerals have been prioritised for value addition based on a "push-pull" approach, including six critical minerals and five strategic minerals (Exhibit 1).

Exhibit 1: Prioritised minerals for value addition.



1. Minerals that can typically be combined to produce similar products. These minerals are kaolin, feldspar, silica, pozzolana, gypsum and dolomite

The "push" (supply-driven) approach focused on identifying value addition opportunities enabled by Tanzania's resource endowment. Minerals with a strong supply position were prioritised based on current and planned production and the size of reserves (Exhibit 2). This analysis identified two strategic minerals, gold and limestone, both of which have existing at-scale production. The analysis also highlighted six critical minerals with significant planned production: graphite, nickel, REEs, cobalt, copper, and iron.[14] Coal, despite its significant production, was not prioritised because of its misalignment with the global energy transition.

[14] Graphite projects may be understated in the planned production data based on feedback from the Ministry of Minerals and Tanzanian mining experts.

Exhibit 2: Current and planned production of priority minerals in Tanzania, $ million, annually.[15]

Strategic Critical Initial list of priority minerals

Value of minerals, $ Mn annually

Minerals	Current production	Planned production	Combined current and planned production
1 Gold	2,957.5	725.5	3,683.0
2 REEs	0	1,483.0	1,483.0
3 Nickel	8.2	618.7	626.8
4 Coal	211.6	383.8	595.4
5 Iron	N/a	293.9	293.9
6 Copper	193.8	34.8	228.6
7 Graphite	2.4	70.0	72.4
8 Cobalt	0.2	71.0	71.1
9 Limestone	68.0	0	68.0
10 Diamond	31.2	0	31.2
11 Other gemstones	24.6	0	24.6
12 Tanzanite	20.6	0	20.6
13 Tin	12.3	0	12.3
14 Silver	7.5	0	7.5
15 Phosphate	6.0	0	6.0
16 Zircon	4.5	0.4	4.8
17 Salt	2.4	0	2.4
18 Ilmenite	2.0	0	2.0
19 Gypsum	0.9	0	0.9
20 Bauxite	0.8	0	0.8
21 Lead	0.1	0	0.1
22 Manganese	0.1	0	0.1
23 Feldspar	0.01	0	0.01
24 Dolomite	0.002	0	0.002

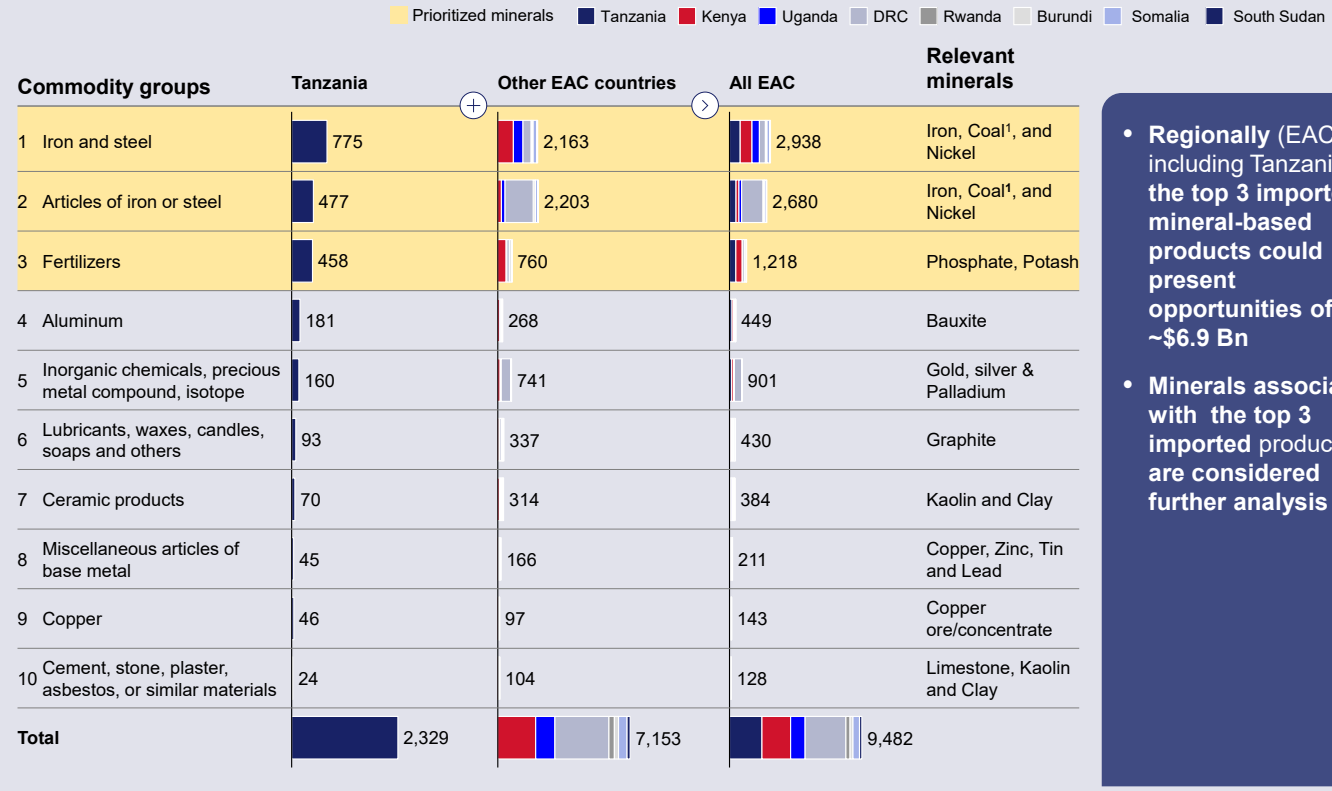
Note: Coal was not prioritised because of its misalignment with the global energy transition. However, it will remain vital for Tanzania short term. Minerals included in "Others" include Zircon ($4.8 mn), Salt ($2.4 mn), Ilmenite ($1.9 mn), Gypsum ($0.9 mn), Bauxite ($0.8 mn), Lead ($0.14 mn), Manganese ($0.07 mn), Feldspar ($0.01 mn), Dolomite ($2.3k).

The "pull" (demand-driven) approach identified minerals with strong downstream market potential. The focus was on high-value imported products where minerals available in Tanzania could play a crucial role as key inputs. Based on both domestic and regional East African Community (EAC) import values, three commodity groups were prioritised: iron and steel, articles of iron and steel, and fertilisers, with a combined regional import value of approximately $6.9 billion (Exhibit 3). As a result, five minerals were identified as demand-driven opportunities: iron, nickel, phosphate, potash, and synergistic minerals.[16]

[15] Mining Commission Annual Report, Ministry of Minerals, Tanzania, 2022, https://www.tumemadini.go.tz/wp-content/uploads/Mining-Commission-Annual-Report-2021-2022-1.pdf.

[16] Synergistic materials are a group of minerals used as additives in products like cement, ceramics and glass, including kaolin, feldspar, silica, pozzolan, gypsum and dolomite.

Exhibit 3: Value of imports in 2023, $ million.[17]



Commodity groups	Tanzania	Other EAC countries	All EAC	Relevant minerals
1 Iron and steel	775	2,163	2,938	Iron, Coal[1], and Nickel
2 Articles of iron or steel	477	2,203	2,680	Iron, Coal[1], and Nickel
3 Fertilizers	458	760	1,218	Phosphate, Potash
4 Aluminum	181	268	449	Bauxite
5 Inorganic chemicals, precious metal compound, isotope	160	741	901	Gold, silver & Palladium
6 Lubricants, waxes, candles, soaps and others	93	337	430	Graphite
7 Ceramic products	70	314	384	Kaolin and Clay
8 Miscellaneous articles of base metal	45	166	211	Copper, Zinc, Tin and Lead
9 Copper	46	97	143	Copper ore/concentrate
10 Cement, stone, plaster, asbestos, or similar materials	24	104	128	Limestone, Kaolin and Clay
Total	2,329	7,153	9,482	

- **Regionally** (EAC including Tanzania), **the top 3 imported mineral-based products could present opportunities of ~$6.9 Bn**
- **Minerals associated with the top 3 imported** products **are considered further analysis**

1. Excluded due to misalignment with the energy transition.

[17] Tanzania Imports by Country, Trading Economics, 2023, https://tradingeconomics.com/tanzania/imports-by-category.

Section 2: Priority value addition opportunities

Section 2: Priority value addition opportunities

Fourteen value addition opportunities were identified across the eleven prioritised minerals. These opportunities could generate between $7.2 billion and $11.7 billion in annual revenue for Tanzania, with between $3.2 billion and $4.3 billion arising from non-gold opportunities. The implementation of these opportunities is time-sensitive; some can be pursued immediately due to the availability of input materials and capabilities, while others require preliminary actions and enablers to be realised. Taking these constraints into consideration, the 14 value addition opportunities can be sequenced across the short- and medium-term (Exhibit 4).

Exhibit 4: 14 prioritised value addition opportunities across a short- and medium-term time horizon.

xx **($, Mn)** Estimated annual value to be captured from the opportunity, per annum

Time horizons	Horizon 1 — Short/near term (1–3 yrs.)		Horizon 2 — Medium term (3–7 yrs.)	
Gold value-addition opportunities	**1. Jewellery** (End use)	~1,000-1,500	**6. Gold Bars** (End use)	~3,000-6,000
Non-gold value-addition opportunities	**2. Cement** (Limestone + synergistic minerals [1] end use)	~130-160	**7. DAP** (Phosphate end use)	~67-95
	3. Ceramics (Limestone + synergistic minerals [1] end use)	~310-370	**8. NPK** (Phosphate + Potash end use)	~65-90
	4. Glass (Limestone + synergistic minerals [1] end use)	~220-250	**9. Spherical Graphite** (Intermediate use) [3]	~400-650
	5. Paper and pulp (Limestone + synergistic minerals [1] end use)	~140-190	**10. REE (Nd-Pr) metals** - (Intermediate use)	~320-400
			11. Finished steel products [2] (End use)	~660-1,000
			12. Nickel sulphate / nickel metal (Intermediate use)	~510-580
			13. Cobalt sulphate/cobalt metal (Intermediate use)	~50-80
			14. Copper cathode / wire (Intermediate use) [3]	~340-360
Total value from non-gold opportunities	~$800M-1B p.a.		~$2.4-3.3B p.a.	
Total value	~$1.8-2.5B p.a.		~$5.4-9.2B p.a.	

Currently, there is a significant oversupply of nickel and cobalt in the market, however, we assume it will resolve in the medium term

1. *These include kaolin, gypsum, dolomite, pozzolana, silica/quartz, feldspar and clay.*
2. *Hot rolled coils and plates.*
3. *Value addition opportunities associated with copper are assumed to be realized at the Kahama processing facilities.*

In the short term, value addition opportunities in Tanzania's minerals sector are associated with strategic minerals, such as gold and limestone.

Currently, strategic minerals account for approximately 93 percent of the country's mineral production by value, with gold alone contributing around 83 percent.[18] This presents a substantial opportunity to gain additional value in the near term, with jewellery offering $1 billion to $1.5 billion. Tanzania's advanced gold sector provides a solid foundation for cultivating a viable jewellery industry, as it requires minimal additional technological and capability enhancements beyond what is already in place.

Limestone opportunities represent $0.8billion to $1.0 billion in short-term value addition potential. Like gold, there is an opportunity to scale up existing small-scale activities and unlock further growth. For instance, Goodwill Ceramics has already established a local ceramics tile production facility with a daily capacity of 300,000 tiles. For cement, there are 14 cement players producing around 9 million tonnes of cement per annum. For glass, there are three existing players with at least one that has recently expanded its operations. Specifically, KIOO Glass received a $60 million loan to expand the capacity of its local glass facility to 35,700 tonnes. Only the paper and pulp industry would require entirely new operations to be set up. However, all necessary inputs to support the development of a robust paper and pulp industry are readily available.

In the medium term, opportunities for value addition associated with critical minerals are expected to emerge. Currently, the production value of critical minerals in Tanzania remains low at $40 million per annum (excluding copper). However, if the planned mining projects materialise in the coming years, they could generate an annual value of $1.6 billion to $2.2 billion through downstream activities.[19] In particular, Tanzania has a unique advantage driven by its large, high-quality reserves and planned production for graphite and REE metals.

Furthermore, gold could provide up to $6 billion in annual value in the medium term as Tanzanian refineries receive LBMA certification. The anticipated timeline for certification is three to five years, and at least one refinery in Tanzania is currently undergoing the certification process. Once its refineries are LBMA certified, Tanzania can become a refiner of locally and regionally mined gold for distribution to the Bank of Tanzania and other global central banks.

Other prospects for value creation could emerge in the medium term, depending on market dynamics such as shifts in global supply and demand, improvements in

[18] Mining Commission Annual Report, Ministry of Minerals, Tanzania, 2022, https://www.tumemadini.go.tz/wp-content/uploads/Mining-Commission-Annual-Report-2021-2022-1.pdf.

[19] Mining Commission Annual Report 2022; USGS: Tanzania 2020-21 annual tables.

Tanzania's infrastructure, and increased availability of critical minerals. For instance, a recovering market for nickel and cobalt, as the current global oversupply is resolved, could pave the way for Tanzania to progress with the planned Kabanga project.[20] This project could potentially yield over $650 million annually through value addition. Similarly, increased mining of phosphate and potash could accelerate the scaling of fertiliser production, which could generate up to $185 million in annual value. Lastly, addressing critical challenges, such as improving access to financing, could enable steel production at the Liganga project. This could unlock as much as $1 billion in annual value.

In the long term, value addition opportunities could emerge across a wider range of minerals, although realising these opportunities would depend on favourable market conditions and the successful scaling of mineral production. Among the minerals with promise for long-term value addition are bauxite and lithium. Tanzania has some bauxite reserves, and aluminium, which is derived from bauxite, is currently the country's fourth highest-value mineral-based import, presenting an opportunity for import substitution. Similarly, lithium, which is gaining global importance due to its use in battery technologies, is already the focus of exploration activities in Tanzania, supported by existing beneficiation regulations. Yet, even after successful explorations, it could take years until the first mine is operational.

The majority of the prioritised opportunities can be realised by leveraging locally available inputs (Table 1). Spherical graphite, REE metals, jewellery, gold bars, steel, nickel, copper and cobalt intermediary products can be produced directly from the primary minerals which are found in Tanzania. They may, however, require imported chemicals, such as hydrofluoric acid, for further processing. The limestone-related opportunities have more complex compositions, but their input minerals are also available domestically, including sand, clay, soda ash, feldspar, alumina, silica, gypsum and more. In contrast, for NPK fertilisers, the scaled production of potash may not be feasible due to low reserves. Scaling NPK fertiliser production could, however, be achieved through collaboration with regional neighbours that have rich reserves, such as the Democratic Republic of Congo and Ethiopia.

[20] The oversupply of nickel and cobalt could be resolved either through a demand shift resulting from, for example, higher than expected demand for high-end EV batteries, increased demand NMC cell chemistries due to higher lithium prices, or a supply shift driven by, for example, lower than expected production ramp-up.

Table 1: Overview of local mineral content for each value addition opportunity.

0% 0-29% 30-69% 70-99% 100%

Product	Share of local minerals	Input priority materials	Other local input materials	Other materials locally unavailable
Ceramics		<20% limestone	~35-45% clay ~30% feldspar ~15% silica	
Glass		~10% limestone	~70%–75% sand ~10% soda ash ~5% dolomite & alumina	
Paper & Pulp		~10% limestone	~85% wood chips	Chemicals and bleaching agents
DAP Fertilizer		~65% Phosphate		~25% ammonia[1]
NPK Fertilizer		20 – 40% phosphate 20 - 40% potash		~30-60% ammonium nitrate and phosphoric acid[1]
Spherical graphite		100% graphite		Chemicals required for processing[2]
REE (Nd-Pr) Metals		100% REE metals		
Finished Steel Products		>98% iron ore	<1% Limestone & Dolomite	<1% coking coal
Nickel sulphate / metal		100% Nickel		Chemicals[3]
Cobalt sulphate / metal		100% Cobalt		
Copper cathode / copper wire		100% Copper		

1. Ammonia can be produced from local natural gas
2. E.g. hydrofluoric, hydrochloric and sulfuric acid, etc
3. E.g., sulfuric acid

Beyond evaluating resource availability and existing capabilities, the opportunities were analysed across two key dimensions: 1) ease of implementation, which considered Tanzania's readiness, required investments, and essential enablers for execution, and 2) potential for global competitiveness, which examined the global market landscape and Tanzania's distinct value proposition within it (Exhibit 5). The aim of the assessment was not to further prioritise the opportunities, but to provide insights into the actions required from both the private and public sectors, the level of risk appetite required from investors, and the capabilities needed to ensure success.

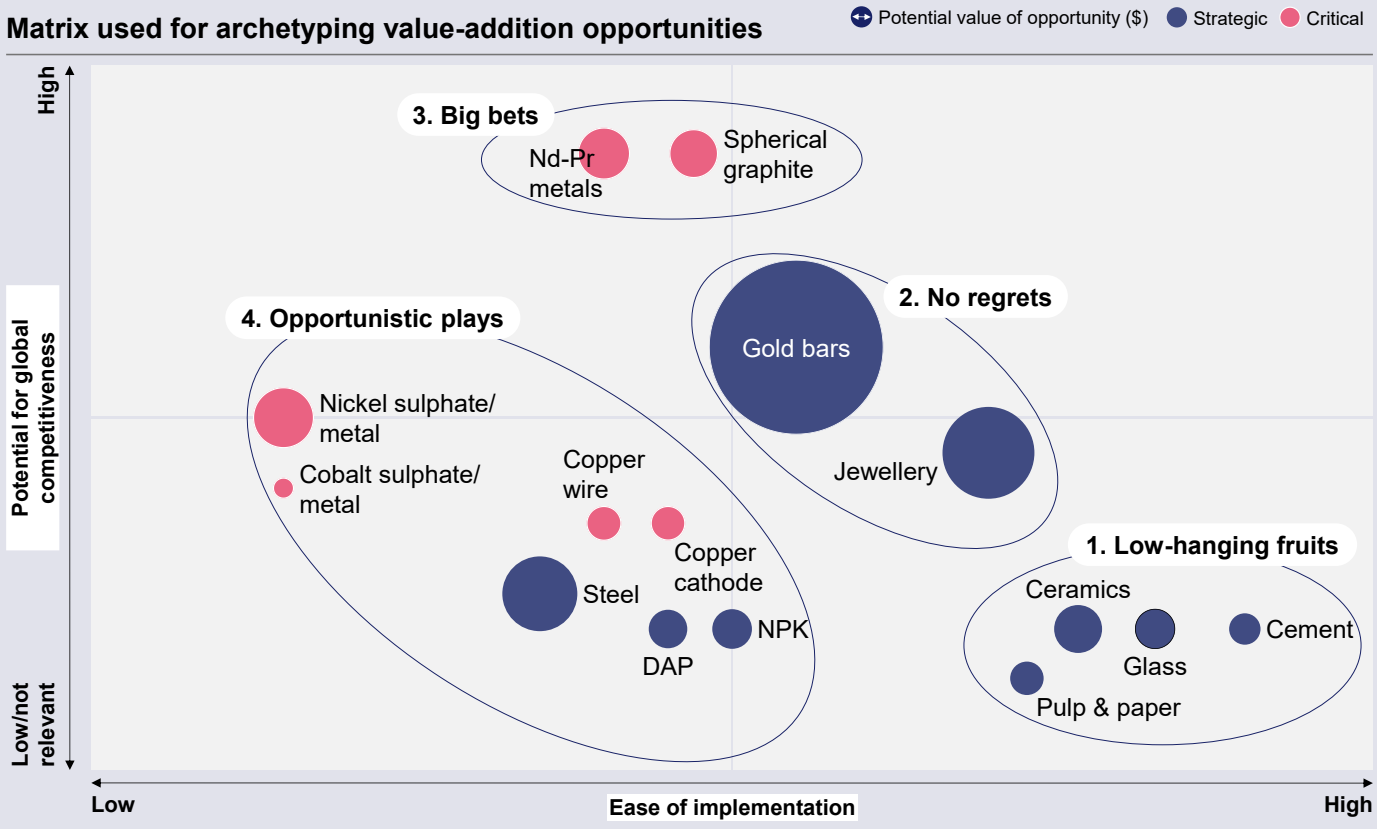
Opportunities were grouped into four key categories:

- **Low-hanging fruit.** These are immediate opportunities that Tanzania can pursue. They target import substitution for local use, followed by export potential to regional markets. These opportunities are likely to have a near-term impact on the local manufacturing industry, have a relatively lower need for technology or skills development, and could be achieved by scaling existing activities or exploring greenfield ventures.
- **No regrets.** These short-term and medium-term opportunities leverage existing capabilities and offer substantial value for Tanzania. Gold is the country's most advanced-stage mineral, making it an obvious, high-impact priority for value addition. Unlike the low-hanging fruit category, no-regret opportunities come with additional prerequisites, such as the time required to attain LBMA certification and the capabilities needed to produce high-quality

jewellery. With Tanzania's substantial gold reserves, gold-related ventures are anticipated to be highly competitive on a global scale, offering a strong potential for business success.

- **Big bets.** These are high-value, complex opportunities tied to the global energy transition. They leverage Tanzania's abundant and high-quality minerals to meet the global demand for inputs to sustainable energy. However, harnessing these opportunities requires overcoming a few key challenges, including synchronisation with mining buildout and technology and capability build-up. Overcoming these challenges will require a focused effort by stakeholders, including those from the government, the private sector, global partners, and off-takers.
- **Opportunistic plays.** These opportunities are more complex and subject to various uncertainties. For example, Tanzania's relatively small potash reserves raise questions about whether there is sufficient mineral access to support large-scale, and therefore competitive, production of NPK fertilisers. For critical minerals such as cobalt and nickel, the current global oversupply and associated price decline create uncertainty around their economic viability. As such, these opportunities require a flexible and opportunistic approach, where players monitor the market to identify the optimal timing for entry.

Exhibit 5: Category mapping for realising value addition opportunities.



Section 3: Details and unlocks for priority value addition opportunities

Section 3: Details and unlocks for priority value addition opportunities

This section outlines the characteristics of each category of opportunity, including the current landscape, the potential for investment to scale existing facilities or explore greenfield opportunities and any relevant risks. It also explores the actions and unlocks which are required to realise the value addition opportunities.

Low-hanging fruit: value addition opportunities ready for immediate action

Low-hanging fruit are short-term opportunities that could yield $0.8 billion to $1.0 billion in annual value for Tanzania. These opportunities leverage abundant local mineral resources, including limestone and synergistic minerals, which are often combined in end products. There are already several established Tanzanian companies in limestone-based industries, including cement, ceramics, and glass manufacturing. The challenge will be to support the scaling of these sectors to meet local demand while positioning Tanzania as a regional exporter to markets with high import needs, like Rwanda and Burundi. The readily available input materials, existing know-how, and local workforce make these opportunities relatively easy to implement in the near term, without relying on imports or significant upstream investments.

Identified low-hanging-fruit opportunities

Cement ($130 million to $160 million opportunity)

Tanzania has an immediate opportunity to substitute imported cement clinker with locally produced alternatives. Today, the Tanzanian cement sector comprises approximately 14 cement manufacturers, eight of which are vertically integrated, spanning the entire value chain from mining to cement production.[21] However, the remaining players do not have upstream activities, including clinker production. Instead, they only perform the final processing and blending to produce cement, relying on a mix of local procurement and the import of cement clinker as input materials.

By capitalising on its limestone deposits, Tanzania can scale up production to fully satisfy local demand for cement clinker and expand its regional supply to countries like Rwanda, Somalia, and Burundi. These countries currently rely on imports for

[21] Expert interviews.

over 50 percent of their cement needs, amounting to more than 1.3 million metric tonnes.[22]

Furthermore, Tanzania's abundant deposits of gypsum, dolomite, pozzolan, and kaolin can be utilised as essential additives to lower production costs, enhance product strength, and reduce carbon dioxide emissions. For example, pozzolana can replace up to 25 percent of clinker, while kaolin can substitute more than 30 percent, delivering both environmental and economic advantages.

Ceramics ($310 million to $370 million opportunity)

Although Tanzania has abundant raw materials for ceramics production, including clay, silica, feldspar, and limestone, and an active ceramics industry, the country still imports over 120,000 tonnes of ceramics annually, valued at more than $70 million, to meet domestic demand. Similar trends are observed across the region in countries such as Kenya, Uganda, and the Democratic Republic of the Congo (DRC), which collectively import more than 350,000 tonnes annually.[25]

Demand trends in Tanzania indicate a growth rate of approximately 4.7 percent per annum, as rising urbanisation drives higher construction activity and demand for ceramic products such as tiles and bathroom appliances. Additionally, rising incomes are driving greater consumption of luxury ceramic products, such as those used for interior decoration, thereby creating a new and growing demand segment.[23] Similar patterns are observed in neighbouring countries, positioning Tanzania as a potential regional hub for ceramic production based on material availability and a small but existing ceramics industry.

Tanzania has two active ceramics producers, namely Goodwill Ceramics and Keda Ceramics. To capture unmet demand, investments could help scale existing production or set up a new greenfield plant. An outside-in business case suggests that setting up an additional 200,000 tonnes per annum ceramics manufacturing facility would require an investment of approximately $50 million. At full capacity, the plant could generate an annual revenue of about $30 million, implying a seven-year payback time. At the same time, it would be able to employ around 400 people.

Glass ($220 million to $250 million opportunity)

Glass production presents a significant opportunity for Tanzania, with a sizable addressable market both domestically and within the EAC region. Despite possessing the essential raw materials, such as silica and limestone, the country remains dependent on imports, bringing in over $50 million worth of glass products annually. Regional markets – notably Kenya, Uganda, and the DRC – import more

[22] Imports by Country, Trade Map, 2023, https://www.trademap.org/.

[23] Tanzania Ceramics Market, 6W Research, 2019, https://www.6wresearch.com/industry-report/tanzania-ceramics-market-2020-2026.

than 300,000 tonnes per annum of glass annually and have limited planned capacity for manufacturing.[24]

Tanzania has a few companies operating in glass production, including KIOO Glass, which has a capacity of more than 40,000 tonnes per annum, and Sapphire Float Glass Co., which has plans to invest more than $300 million and create about 1,600 direct and 6,000 indirect jobs.

By scaling its glass industry, Tanzania can capture both import substitution and regional export value while creating downstream opportunities in packaging, construction and consumer goods manufacturing.

Paper and pulp ($140 million to $190 million opportunity)

Despite having the raw materials required to build a domestic industry, Tanzania imports over 100,000 tonnes per annum of paper and pulp annually. Timber wood, which makes up 75 percent to 90 percent of paper input, exists in abundance and is readily available, with Tanzania among the top six African timber producers.[25] Another critical input is limestone, which serves as a filler and coating agent, enhancing the brightness, opacity, and smoothness of the final product.

Although Tanzania currently lacks active paper and pulp production, developing this sector could reduce the country's reliance on imports while fostering connections with its forestry and agro-processing industries. This, in turn, could generate employment opportunities across multiple value chains. In addition to meeting domestic needs, an established paper and pulp sector can support regional exports over time, particularly as East African economies industrialise.

There are four potential areas of action to pursue these opportunities

1. Monitor local and regional demand

Efforts can be made to closely track shifts in local and regional demand for cement, ceramics, glass, and paper and pulp. Mechanisms may be established to regularly assess supply-demand dynamics, enabling early identification of mismatches between production capacity and market needs. In doing so, opportunities for capacity adjustments and targeted market interventions to promote local value capture can be explored.

2. Establish a conducive regulatory environment

A conducive regulatory framework could be fostered to encourage local value addition and gradual import substitution. Relevant incentives and policies may be

[24] Imports by Country, Trade Map, 2023, https://www.trademap.org/.

[25] Top 15 Timber-Producing Countries in Africa, Global Wood, 2023, https://www.globalwood.org/news/2023/news_20230808d.htm.

introduced to support the use of locally produced intermediaries, such as cement clinker, while also encouraging the adoption of cost-effective and lower-carbon raw materials like pozzolana and kaolin.

3. Attract investment

Targeted efforts could be made to attract greater investment in existing and emerging value addition industries. Scaling production in sectors like ceramics and glass, while fostering the development of a paper and pulp industry, could be supported through regional financing coalitions, public-private partnerships, and investment mobilisation efforts. Further, clear investment promotion initiatives could help position these industries as attractive opportunities for both local and international investors.

4. Enable competitiveness to access the regional market

Focusing on supply chain efficiency and infrastructure improvements could enhance competitiveness locally. Continued improvements in logistics, energy transmission and transport networks may help reduce operating costs and improve reliability. By enhancing these foundational enablers, Tanzanian industries may be better positioned to capture regional market opportunities, building on the country's proximity advantage and resource availability.

No regrets: An opportunity to build on an existing strong foundation

Gold remains a key economic driver for Tanzania, supported by its significant mineral reserves, active mining activities, and expanding refining capacity. As one of Africa's top ten gold producers, Tanzania produces over 50 tonnes of gold annually, with contributions from more than one million small-scale miners and major companies like AngloGold Ashanti, Barrick Gold and Shanta Gold, which collectively account for over 70 percent of the country's gold output.[26] Tanzania has also established itself as a refining hub, with five active refineries capable of processing up to 450 tonnes of gold annually, nearly half of Africa's total gold production.[27] Furthermore, Geita Gold Refinery (GGR) is on track to achieve LBMA certification, a prestigious milestone that would position Tanzania as a leading gold processing hub for East and Central Africa.

The Tanzanian government actively supports local value addition in the gold sector by promoting domestic refining and processing. Initiatives include engaging large-scale miners to strengthen local value chains and launching a domestic gold

[26] Mining Commission Annual Report, Ministry of Minerals, Tanzania, 2022, https://www.tumemadini.go.tz/wp-content/uploads/Mining-Commission-Annual-Report-2021-2022-1.pdf.

[27] Expert interviews.

purchase programme that allows miners and resellers to sell directly to the Bank of Tanzania at the spot price. This programme offers incentives such as reduced royalty fees, the removal of inspection fees and a 0 percent VAT rate, making local gold processing more attractive by guaranteeing an off-taker. With its strong mining and refining sectors, Tanzania is well-positioned to capitalise on promising opportunities for value addition, solidifying its status as a regional leader in gold production and processing.

Identified opportunities for gold value addition

Jewellery ($1.0 billion to $1.5 billion opportunity)

Tanzania has an opportunity to tap into the global gold jewellery market, which accounts for about 40 percent of total gold demand. The global gold jewellery market has been growing steadily, with a projected annual growth rate of around 4 percent to 5 percent.[28] Driven by strong demand from regions such as the Middle East, India, and China, this market presents an opportunity for Tanzania to establish itself as an export hub while also meeting the modest local and regional demand for gold jewellery. Jewellery, including rings, necklaces, and bracelets, is created through processes such as melting, shaping, and polishing, which require minimal infrastructure or capabilities. With Tanzania's abundant gold resources and refining capacity, the country can immediately produce both artisanal jewellery and large-scale production to meet demand for handcrafted designs and cost-competitive, mass-produced pieces.

Gold bars ($3 billion to $6 billion opportunity)

Gold bars are used by high-net-worth individuals, central banks and institutional investors as a store of value, and account for 40 percent of global gold consumption. This market has seen steady growth, with demand for gold bars increasing by approximately 3 percent to 4 percent annually.[29] Central banks are expected to remain net buyers of gold through to 2035. By securing LBMA certification for its refineries, Tanzania can meet international standards and access global markets, offering gold bars to central banks and investors in regions such as the Middle East, Asia and Europe. This sector holds significant growth potential, enabling Tanzania to capitalise on the rising demand for gold as a store of value while leveraging its competitive refining capabilities.

[28] Jewellery Market to Reach $482.22 Billion By 2030, Grand View Research, 2024, https://www.grandviewresearch.com/press-release/global-jewelry-market.

[29] Gold Demand Trends: Full Year 2024, World Gold Council, 2025, https://www.gold.org/goldhub/research/gold-demand-trends/gold-demand-trends-full-year-2024.

There are two potential areas of action to pursue these opportunities

1. Increase access to financing for gold miners

Many small-scale miners currently rely on pre-financing agreements from international investors, particularly from the Middle East, which commits a significant portion of its gold to foreign refineries, limiting feedstock availability for local value addition. By establishing gold-focused microfinance institutions or funds, Tanzania can enhance access to alternative financing options for miners and use gold for local value addition.

2. Obtain LBMA certification for a Tanzanian refinery

Setting up an LBMA-certified refinery would position Tanzania as a regional hub for gold processing. At present, Tanzanian miners refine their gold abroad to meet the international standards required by central banks. By supporting the GGR, a leading contender for LBMA certification, Tanzania could provide a local solution for large-scale miners and producers, enabling them to sell directly to central banks more efficiently. Achieving this certification would not only simplify the process for Tanzanian producers but also strengthen the country's reputation as a leader in responsible and high-quality gold production within the region.

Big bets: Opportunities to extract significant value for Tanzania

The global energy transition, driven by the urgent need to combat climate change, is heavily reliant on critical minerals that are essential for renewable energy technologies and electric vehicles (EVs). For example, key REEs such as neodymium (Nd) and praseodymium (Pr) are indispensable for producing high-performance magnets used in EV motors and wind turbines, with no viable substitutes currently available. According to the International Energy Agency (IEA), the demand for critical minerals is expected to rise sharply over the next two decades. Specifically, demand for copper and REEs is projected to grow by over 40 percent, nickel and cobalt by 60 percent to 70 percent, and lithium by nearly 90 percent.[30]

This surging demand positions resource-rich countries like Tanzania, with its reserves of graphite, REEs, cobalt, nickel, and copper, as pivotal players in the global supply chain. Tanzania's graphite reserves are crucial for producing anodes

[30] The Role of Critical Minerals in Clean Energy Transition, International Energy Agency, 2022, https://iea.blob.core.windows.net/assets/24d5dfbb-a77a-4647-abcc-667867207f74/TheRoleofCriticalMineralsinCleanEnergyTransitions.pdf.

for lithium-ion batteries, with planned production expected to exceed 300,000 tonnes annually. At the same time, countries are striving to diversify their supply chains, as over 90 percent of critical minerals and their intermediate products are currently sourced from China. Tanzania's high-quality reserves, combined with its stable political environment, growing mining sector, low-cost electricity, access to ports, and improving infrastructure, make it a compelling alternative for investors and nations seeking supply chain diversification. This applies not only to the mining of critical minerals but also to the development of vertically integrated value addition capabilities.

However, as demonstrated by case studies from countries like Chile (lithium) and Indonesia (nickel), success in downstream value addition requires a combination of targeted policies, strategic investments, global partnerships, and close collaboration with stakeholders. For Tanzania, developing value-added products such as spherical graphite and Nd-Pr metals could unlock an annual economic opportunity of $0.7 billion to $1.1 billion, generate $100 million in government revenue, and create approximately 500 highly skilled jobs. Beyond the immediate economic benefits, these opportunities position Tanzania as a key player in the global energy transition while fostering upskilling, knowledge transfer, and long-term economic growth.

Identified opportunities for value addition to support the global energy transition

Spherical graphite ($400M to $650M opportunity)

Tanzania is ranked among the top five countries globally for graphite reserves, with over 70 percent of its graphite exceeding 100 mesh – significantly higher than the international standard of 50 percent to 60 percent.[31] This mesh size makes Tanzania's graphite suitable for conductivity and energy storage applications, including lithium-ion batteries, and allows it to command a higher market price. Planned projects, including the Mahenge project, Lindi jumbo project and Epanko project, are expected to produce approximately 300,000 tonnes of graphite flakes annually within the next seven years, making the country also a top five global graphite producer.

Spherical graphite is an intermediate product essential for lithium-ion batteries, which are used in EVs. Owing to the increasing adoption of EVs, the market is experiencing rapid growth at a compound annual growth rate (CAGR) of 33 percent. By 2033, EVs are projected to account for 88 percent of the total demand for natural graphite.[32] Key demand centres are located in China, the United States, the

[31] USGS, company investor reports.

[32] European Advanced Carbon and Graphite Materials Association.

European Union, Japan and South Korea, and are primarily supported by EV original equipment manufacturers (OEMs).

Setting up a spherical graphite processing plant with a capacity of 50,000 tonnes per annum would require a $340 million investment. The required graphite concentrate could be sourced from mines in Tanzania's southern region. Once production is ramped up to full capacity, the annual revenue could reach $375 million. Even without assuming a more cost-effective vertically integrated set-up, the processing plant could reach an operating margin of 30 percent, implying a four-year payback time. It would also create about 200 direct jobs.[33]

While Tanzania is well-positioned to become a key player in graphite mining and value addition, there are two key challenges:

- Spherical graphite production is highly complex, with limited intellectual property in Tanzania serving as a significant barrier to entry. Today, most of the intellectual property is held by Chinese firms, which produce more than 95 percent of spherical graphite. However, there are emerging players in countries like Canada, South Korea and Sweden.
- Graphite prices have been experiencing downward pressure, driven by oversupply from China, making the market highly cost competitive.

Tanzania's quality of resources, the cyclical nature of commodity markets, and its position as an alternative to Chinese production in the ongoing geopolitical climate keep spherical graphite production a viable big bet opportunity.

Rare earth minerals ($320 million to $400 million opportunity)

Tanzania has significant reserves of rare earth minerals, including Nd-Pr metals, and the country's rare earth production capacity is poised for substantial growth. Peak Rare Earths forecasts an annual production of 37,200 tonnes per annum of concentrate (45 percent Total Rare Earth Oxides grade), positioning Tanzania to become a top-five global producer.[34] The market for REEs is expected to expand at a CAGR of approximately 8 percent, driven by the rise in EV production and renewable energy projects.[35] Major demand hubs are found in China, the US, Japan and Europe.

Setting up a REE (Nd-Pr) separation plant could be a highly attractive investment opportunity. A plant with an annual capacity of 37,200 tonnes per annum would require an investment of approximately $462 million. With a potential annual

[33] Details and assumptions can be found in the online appendix, https://manufacturingafrica.org/download/appendix-mineral-value-addition-in-tanzania/.

[34] Ngualla Project, Peak Rare Earth, https://peakrareearths.com/ngualla-project/.

[35] "Rare Earth Metals Market Projected to Reach USD 16.26 Billion by 2032," Globe Newswire, 2025, https://www.globenewswire.com/news.

revenue of $390 million, the plant could have a payback time of less than four years. Additionally, 290 direct jobs could be created.[36]

Rare earth mining and processing are highly specialised and capital-intensive, with considerable technological challenges. Similar to graphite, this opportunity remains a big bet given the early development stage of REE mining projects and the technological complexity.

[36] Details can be found in Box 1.

Box 1: Example business case rare earth metal

The business case for rare earth metals assumes a vertically integrated separation plant with 3,600 tonnes per annum capacity. The plant would be in a special economic zone unlocking a 10-year tax break and it also assumes a three-year ramp-up period for production. Further, a 20 percent premium has been added to all costs to account for any inefficiencies versus benchmarks while conservative prices have been assumed.

With these assumptions, rare earth separation plants would provide a lucrative investment opportunity for investors. The projected rate of return of 22 percent falls between expected industry standards of 18 percent to 25 percent, even after the cost premium. Additionally, the opportunity has a projected operating margin of 39 percent, with a three to four-year repayment period. Given geopolitical tensions and the increasing demand for REEs, this opportunity could potentially provide returns at a higher rate driven by higher market prices and a higher premium on alternative sources of REE metals.

The business case closely resembles the Rainbow plant in South Africa. The case story mirrors the plant in two key characteristics: the plant is vertically integrated with a mine and has a production capacity of 1,800 tonnes of Nd-Pr metals annually. Rainbow's REE Phalaborwa project is among the world's most profitable projects due to the low operating expenditures associated with gypsum waste being used as a raw material, limiting traditional hard rock mining. They report an internal rate of return of 38 percent and a 75 percent operating margin with approximately $300 million capital investment, signalling the potential to make significant returns from metal processing.

Additional business cases can be found in the online appendix.

Exhibit 6: Investment requirements and returns for an Nd-Pr separation plant.

NPV, $M	Operating margin, %	IRR, %	Payback, years
368.9	**39**	**22**	**3.7**
Assumptions			
Capacity	**Nd-Pr metal volume**, ktons/year		3.6
Revenue	**Annual Revenue**, avg. $M/year		~390
Cost	**COGS**, avg. $M/year		~142
	Processing cost, avg. $M/year		~89.4
	CAPEX, total $M		~462

Disclaimer: *Mini business cases have been developed to give an indication of the investment size and potential of some of these opportunities. They serve as a directional view of the investment requirements and potential returns, however, should not be used as investment advice.*

There are five potential areas of action to pursue these opportunities

1. Develop a targeted national strategy for graphite and REE (Nd-Pr) value chains

To effectively extract value from its priority minerals, particularly graphite and rare earths, Tanzania could develop a comprehensive National Strategic Framework. This framework may expand on existing regulations to develop mineral-specific approaches, for example, linking upstream activities to local value addition. Additionally, a workforce plan could be developed to assess future needs, identify skill gaps and implement initiatives to build the necessary human capital.

2. Create an enabling business environment for value addition activities

To facilitate cost-competitive production of big bet opportunities, Tanzania can consider actions to improve the business environment by, for example, expanding the entry requirements for Special Economic Zones (SEZs) or expanding the SEZ status to companies that fulfil specific criteria, such as alignment with Tanzania's value addition priorities. This would enable mining companies to optimise operations by developing vertically integrated businesses while benefiting from the 10-year tax break, which is essential for investment attractiveness.[37]

3. Establish partnerships

To address the intellectual property barriers and high capital needs associated with spherical graphite production and REE metal separation, forming strategic partnerships with leading global players would be essential.

Key players in spherical graphite production include, but are not limited to, BTR, Shinzoom and Shanshan from China, POSCO from South Korea, and Nouveau Monde Graphite and Syrah Technologies from Canada and Australia, respectively. For REE metal separation, leading companies include, but are not limited to, Guangdong Rare Earth Industrial Group and China Rare Earth Group from China, MP Materials and Neo Performance Materials from the US, and Lynas Rare Earths and Rainbow Rare Earths from Australia and the United Kingdom, among others.

Tanzania has already attracted substantial investment from major graphite processors such as BTR and POSCO in its graphite mining, indicating a strong global interest in this area.

4. Attract regional and global investors

To unlock the growth of the mineral value addition sector, Tanzania needs to attract significant investment for projects with a relatively high-risk profile. Tanzania could

[37] Mining companies could develop co-located value addition plants alongside their mining operations which typically are not located in SEZs.

consider collaborations with regional investors to develop targeted financial instruments that de-risk the investment. Fiscal instruments that can be considered to support the financial instruments include preferential loan terms or guarantees. Additionally, Tanzania can raise awareness about the sector's potential through, for example, the Tanzania Investment Centre (TIC) to attract global investment capital.

Tanzania may consider initiatives to close the gap to its peers on some dimensions related to the ease of doing business and investment-related costs. For instance, Tanzania levies a 16 percent free-carried interest rate, which is higher than peer nations with comparable mineral reserves, such as Mozambique (5 percent) and the DRC and Madagascar (10 percent). Tanzania also applies a 30 percent capital gains tax on changes of control exceeding 50 percent, a tax that is not present in many peer countries. Additionally, Tanzania levies VAT on consumables in the mining sector, whereas other mining-friendly nations often offer broad tax exemptions to promote the industry.

5. Invest in targeted infrastructure and industry development

To position Tanzania as an efficient and cost-competitive global player in the mineral value addition sector, it is essential to develop targeted infrastructure that supports industrial growth and streamlines logistics. Drawing inspiration from successful models such as Morocco's phosphate slurry pipelines, Tanzania could consider prioritising expanding critical infrastructure such as road and rail networks, particularly to resource-rich regions like Lindi, where industrial activities and mineral processing can be scaled. Improved connectivity to ports, such as the Port of Mtwara, would facilitate the efficient export of processed minerals and finished products, reducing transportation costs and enhancing global competitiveness.

Additionally, investments in energy infrastructure, industrial parks or even synergistic industries can help improve the project's attractiveness to investors. Reliable energy infrastructure can help ensure efficient plant operations, modern facilities in industrial parks can reduce the projects' upfront CAPEX, and synergistic industries can help reduce operational costs. The latter is especially important for spherical graphite. For instance, spherical graphite can benefit from co-location with steel production, enabling the cost-effective use of a common chemical waste facility.[38]

Opportunistic plays: Navigating market dynamics – identifying the right moment for action

While many of the identified minerals offer clear and immediate paths for development, others present more complex global and local dynamics that require a deeper understanding of market trends. Successfully navigating these

[38] Both spherical graphite and steel use sulfuric acid which requires specialised waste management.

opportunities depends on recognising the right time to enter the market, which requires knowledge of evolving market conditions, supply-demand imbalances and global shifts. Seizing these more complex opportunities requires developing internal expertise and adopting a flexible, proactive approach. Opportunistic plays can be categorised into two groups based on their key characteristics:

Local and regional opportunistic plays

DAP and NPK fertilisers ($320 million to $400 million opportunity)

DAP and NPK fertilisers have strong local and regional demand, as Tanzania and the broader EAC remain heavily dependent on imports to meet their needs.[39] Tanzania imports approximately $458 million annually to support its agriculture sector, making fertilisers the third-highest import commodity.[40] DAP and NPK compounds account for about 40 percent of all imported fertilisers.

Although companies like Minjingu and Yara produce fertilisers locally, they meet only approximately 5 percent of domestic demand, creating a significant opportunity for value capture. However, fertiliser production is limited by the small-scale availability of priority minerals such as phosphate and potash, along with limited access to essential raw materials like ammonia and sulphur. There are limited plans to create large-scale, sustainable availability of these minerals, making this a medium-term opportunity.

After the supply constraints are resolved, a fertiliser production plant with an annual capacity of 200,000 tonnes could be established with an estimated investment of approximately $200 million. This facility could create 250 additional jobs and generate annual revenues of around $130 million, resulting in a payback period of approximately six years.

Finished steel products ($660 million to $1.2 billion opportunity)

Iron is one of the key minerals prioritised for value addition in Tanzania, largely due to the substantial volume of related imports. The country currently imports $775 million worth of iron and steel, which are semi-finished and finished products, as well as an additional $477 million in specialised iron and steel articles.[41] These specialised products include items such as pipes, tubes and structural components.

The Liganga project is projected to produce over 3 million tonnes of iron ore annually, which would provide enough input minerals for at-scale steel production. However, existing challenges include funding constraints and infrastructure

[39] NPK fertilizer is a widely used commodity fertilizers, produced in large volumes and delivering essential macronutrients – nitrogen (N), phosphorus (P2O5), and potassium (K2O) – to crops. DAP fertilizer is the most used phosphorous fertilizer, composed of nitrogen (N) and phosphorus (P2O5).

[40] Imports by Country, Trade Map, 2023, https://www.trademap.org/

[41] Imports by Country, Trade Map, 2023, https://www.trademap.org/

challenges that limit the transportation of the goods, given their weight. Beyond upstream obstacles, steel production also encounters significant barriers, such as the substantial energy required to reach temperatures above 1,000°C.

Despite these constraints, local companies are producing finished steel products from imported billets or scrap due to the limited availability of local alternatives.

Copper cathode/wire ($340 million to $360 million opportunity)

Copper cathodes and wires are in demand across the East African region. The region imports $143 million annually, with Kenya importing about $60 million and Tanzania importing $45 million. For this opportunity to be economically viable, significant scale is required. Copper requires a minimum scale of more than 100,000 tonnes per annum to reach viability, while Tanzania currently produces a total of approximately 35,000 tonnes per annum.[42] Therefore, to enable Tanzania to produce cost-competitive refined copper for downstream processing, the country either needs to scale up copper production to an economically viable level or use existing refining capacities, such as the Kahama nickel refinery, to process synergistic minerals.

There are two potential areas of action to pursue these opportunities

1. Ensure adequate availability of priority minerals

A major unlock for some of the opportunities will be the reliable and sufficient availability of the required input minerals:

- **Fertilisers**. Tanzania can contribute to unlocking these opportunities by supporting and accelerating the utilisation of the 5 million tonnes of proven phosphate reserves in the Manyara region, the ongoing phosphate explorations, such as the Magugu project in Manyara, and the development of the potash mine prospecting in Manyara, Arusha, Dodoma and Katavi. Alternatively, public and private stakeholders can explore building partnerships across the region, for example, in Ethiopia, to import phosphate and potash.
- **Steel**. Tanzania can explore ways to support existing pipeline projects, including the planned integrated Liganga and Mchuchuma project, to move into production stages. Unlocks may include supporting the stakeholders to secure affordable capital and developing viable road networks for the effective movement of the finished goods.

2. Ensure the availability of other important raw materials

- **Fertilisers**. Private sector players can seek cost-competitive input materials by collaborating with local metal smelters that produce them as byproducts or by

[42] Expert Interviews

fast-tracking the development of natural gas projects to secure ammonia supplies.

Global opportunistic plays

Cobalt and nickel sulphate or metals ($560 million to $660 million opportunity)

Tanzania possesses ample cobalt and high-quality nickel resources in the northern region, particularly at the Kabanga Nickel Mine. Tembo Nickel has already outlined plans to establish local refining operations and has obtained a metal refining licence for both cobalt and nickel. Collectively, these opportunities could generate annual revenues of approximately $560 million to $660 million.

However, market uncertainty and price volatility present challenges, primarily due to the shift in battery technology from nickel and cobalt-based NMC (nickel manganese cobalt) batteries to lithium-iron-phosphate (LFP) batteries. Additionally, the global market is oversupplied by major producers such as Indonesia (nickel) and the DRC (cobalt), a trend that is expected to persist into the 2030s. The rapid decline in nickel prices makes this a financially unviable opportunity in the short term. However, as with most commodities, market correction is anticipated and may be realised in the medium term.

There are two potential areas of action to pursue these opportunities

1. **Monitor global markets to time investments in cobalt and nickel processing**

To support strategic production planning, Tanzania could implement ongoing monitoring of market indicators and forecasts to inform its decisions. Establishing a strategic market monitoring system would enable the country to anticipate shifts in global oversupply and scale up local extraction activities. Simultaneously, Tanzania could target niche markets that are underserved by global supply, such as countries looking to diversify their sourcing or markets with demand for specialised alloy products, positioning itself to benefit from these opportunities.

2. **Engage with end users in target markets**

Private sector stakeholders can develop off-take agreements with manufacturers that depend on cobalt and nickel, such as battery producers or speciality alloy manufacturers. These agreements can help to derisk their investments and potentially accelerate the timeline to production.

Section 4:
Path forward

Section 4: Path forward

Tanzania's mineral value addition offers a substantial opportunity for companies, investors, and the nation at large. By enhancing value addition, Tanzania can drive economic growth, generate employment, and establish itself as a vital player in the regional and global critical mineral supply chain. However, achieving this potential will require coordinated efforts from both public and private sector stakeholders to address key enablers and unlock opportunities.

The government can explore actions to further promote a conducive business environment that attracts investment and supports sustainable growth. This could include considering the right incentives, ensuring cohesive and stable regulatory frameworks, aligning policy actions with a clear strategy, and addressing critical infrastructure needs such as rail, road, and energy systems. The government can also play a pivotal role in advancing key mining projects and expediting exploration efforts to ensure an adequate supply of mineral resources, thereby supporting medium-term value addition opportunities. Recent initiatives, such as the Memorandum of Understanding with the British Geological Survey to advance exploration and the merger of the Tanzania Investment Centre with the Export Processing Zones Authority to enhance incentives for manufacturers, underscore the government's commitment to fostering an environment that supports mineral value addition. Continued focus on such efforts will be essential to achieving the country's ambitions in this space.

The private sector is equally vital in driving this transformation. Investors, banks, and companies can provide the necessary capital, forge partnerships to enhance supply chains, and facilitate the transfer of intellectual property and technical expertise. In doing so, private sector stakeholders can not only support Tanzania's development but also seize substantial opportunities in this rapidly expanding sector.

This report has outlined specific opportunity areas within Tanzania's mineral value addition landscape and is intended to serve as a starting point for further engagement. It aims to spark interest among global investors and encourage local stakeholders to engage in deeper discussions and innovative approaches. With the right actions and collaboration, Tanzania is well-positioned to emerge as a regional leader in mineral value addition and a key contributor to the global critical mineral supply chain in the years to come.