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ABBREVIATIONS AND SYMBOLS

A$	Australian dollar
B-billion	thousand
CIF	cost, insurance, freight
DMRE	Department of Mineral Resources and Energy
e	estimate
ETL	Exchange Traded Fund
FOB	free on board
FOR	free on rail
g/t	gram per ton
kg	kilogram
KPCS	Kimberley Process Certification Scheme
kt	thousand tons
lb	pounds avoirdupois
LME	London Metal Exchange
m	metre
Mt	million tons
Mt/a	million tons per annum
n/a	not available
ozt	troy ounce
PICC	Presidential Infrastructure Co-ordination Committee
PGM	Platinum Group Metals
q-o-q	quarter on quarter
SARB	South African Reserve Bank
SACCI	South African Chamber of Commerce and Industry
t	metric ton
t/a	tons per annum
t/m	tons per month
y-o-y	year on year
µ	micro-
$	US dollar, unless stated otherwise
¥	yen
€	Euro

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1. GLOBAL ECONOMIC OUTLOOK.

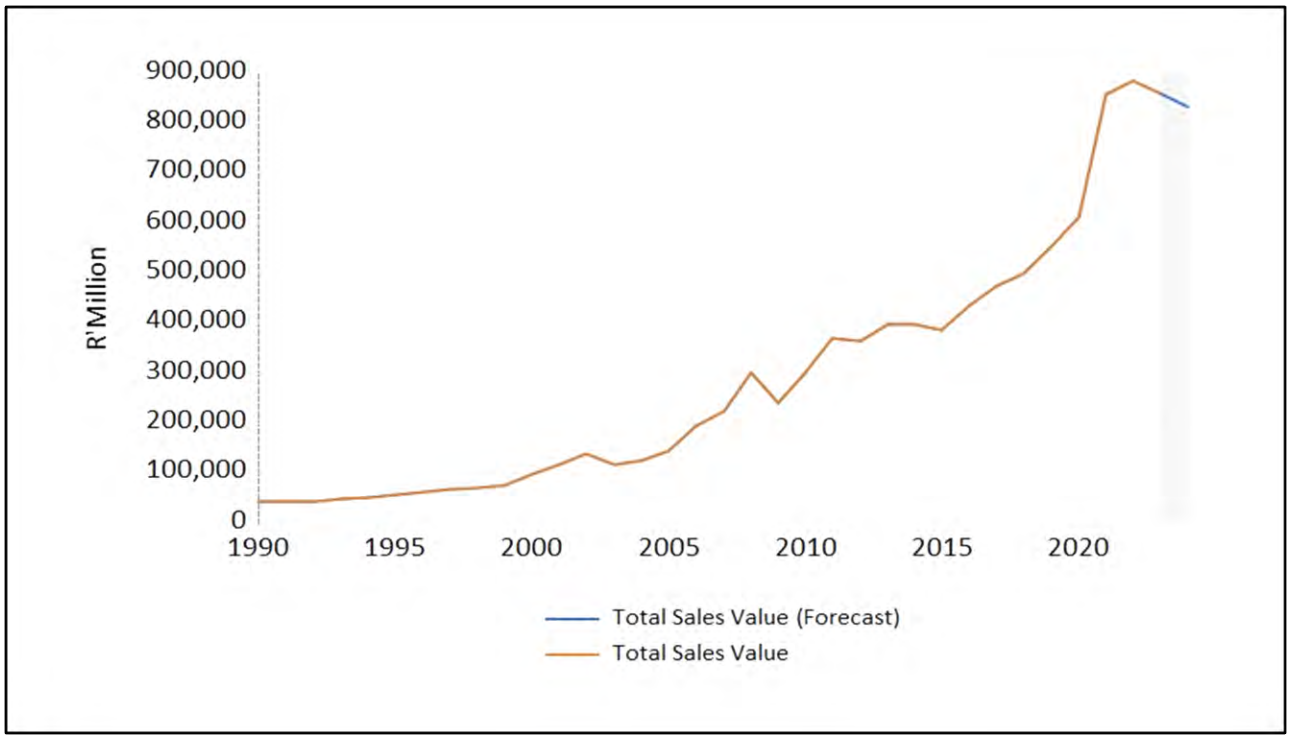
Spotlight on the mining industry.

The global economy is expected to grow by 3.2 percent in 2024, the same as growth realised in 2023. The growth level continued to be below the pre-Covid-19 pandemic level, averaging 3.8 percent between 2000 and 2019. Growth is expected to be driven by the decline in inflation, easing of monetary policies, and better economic performance from Russia, Brazil, the United States, and other emerging markets.

The global economic performance is set to affect industries such as mining, since it is intertwined with the overall state of the world economy. The mining industry is impacted by various macro and local dynamics, such as global economic performance, infrastructure spending, and geopolitical tensions. Thus, value of mining investment will be guided by the abovementioned factors (economic growth, infrastructure spending, and geopolitics) in 2024.

South Africa's economy is expected to register a 0.9 percent growth in 2024, up from 0.7 percent in 2023, driven by the global economic performance and structural reforms aimed at improving the rail and energy infrastructure. The slow-moving economic performance has already started impacting the mining sector. By the end of March 2024, the mining industry had accumulated about, R184,0 billion in earnings, 4.12 percent lower than the same period in 2023, driven by load-shedding as well as, rail and ports operational issues that continue to hamper the export capacity.

FIGURE 1: SOUTH AFRICA'S MINING PRODUCTION VALUE FROM 1990 TO 2024.



Source: DMRE, Directorate Mineral Economics and Statistics.

Mining revenue is expected to decline by 2.97 percent from R859,4 billion earned in 2023 to about R 833,9 billion in 2024 (Figure 1). The decline in commodity prices, transport, and energy constraints are expected to exert a downward pressure on the mining industry's performance. The World Bank predicts the decline

in energy and non-energy commodities prices. However, base metals prices are expected to go up, driven by the growing production of clean energy technologies in 2024.

The mining industry is crucial to South Africa's economy through its contributions to income tax revenue, royalties, and exchange rate reserves. Poor performance of the sector will harm the country's revenue. The cabinet's approval of the freight logistics roadmap and the Electricity Regulation Amendment Bill is expected to alleviate pressure experienced by businesses, in the short term. This would lead to an improved mining sector performance beyond 2024.

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Kabelo Tshetlhanyane

2. SOUTH AFRICA'S EXPLORATION POTENTIAL

Reimagining exploration in South Africa.

South Africa is one of the richest mining jurisdictions, with an abundance of mineral resources in the world. However, the country's mining industry has been in a state of decline, due to an array of challenges, the most pertinent being the lack of investment in exploration. Over the past 30 years there has been limited green field mineral exploration, with current mineral exploration activities concentrated on expanding existing mines. Although this is a global phenomenon, the lack of geoscientific data at a required scale to inform investment decision has been one of the major challenges identified by the Council for Geoscience (CGS) of South Africa.

With a global race to secure the supply of critical minerals such as cobalt, copper, chromium, lithium, nickel, platinum group metals (PGMs) and rare earth elements, for the world's clean energy revolution towards net zero carbon emissions, South Africa gears up to revive its investment attractiveness in greenfield exploration, with a target of attracting the 2003 level of 5 percent share of global exploration expenditure by 2025. The global exploration expenditure is estimated to reach $18 billion in 2025 and, South Africa aims to claim US$900 million of this expenditure within a five-year period. This target will be achieved through the implementation of the published exploration strategy for South Africa's mining industry and its implementation plan. The exploration strategy implementation plan seeks to re-introduce an enabling environment to facilitate exploration and unlock mineral wealth.

The department of Mineral Resources and Energy (DMRE), through stakeholder engagements has identified the barriers to greenfield exploration and is in the process of addressing and prioritising the possible solutions. Among the priority interventions to reignite exploration, DMRE announced the sourcing of the overarching automated mining licensing system also known as the cadastre system. The system aims at eliminating human interference with the application process for prospecting and mining licenses and promote transparency, speed, and efficiency in dealing with overlapping applications. The department also established the Junior Mining Exploration Fund to assist the junior miners to access financial instruments to kickstart the exploration activities. The department is actively engaging with other stakeholders to explore other financial instruments such as flow through shares tax model, to attract equity investors into the sector.

According to CGS, with over 150 years of mining experience and over 53 minerals, South Africa has only exploited a small fraction of its total mineral wealth. The green energy transition presents great opportunities for countries like South Africa that possess several of these critical minerals and massive untapped deposits. CGS has identified Northern Cape Province as a focus area to accelerate mapping and improve the country's geoscience data and information to encourage investment in the exploration space.

The sustainability of the mining industry depends on the exploration for and discovering of new mineral deposits. These initiatives have the potential to awaken the mining industry and take full advantage of the imminent critical minerals boom. Advantages from mining is that it is a trusted catalyst for the country's direct and indirect job creation, industrialisation and general economic growth.

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Silungiselelo Mnyameni

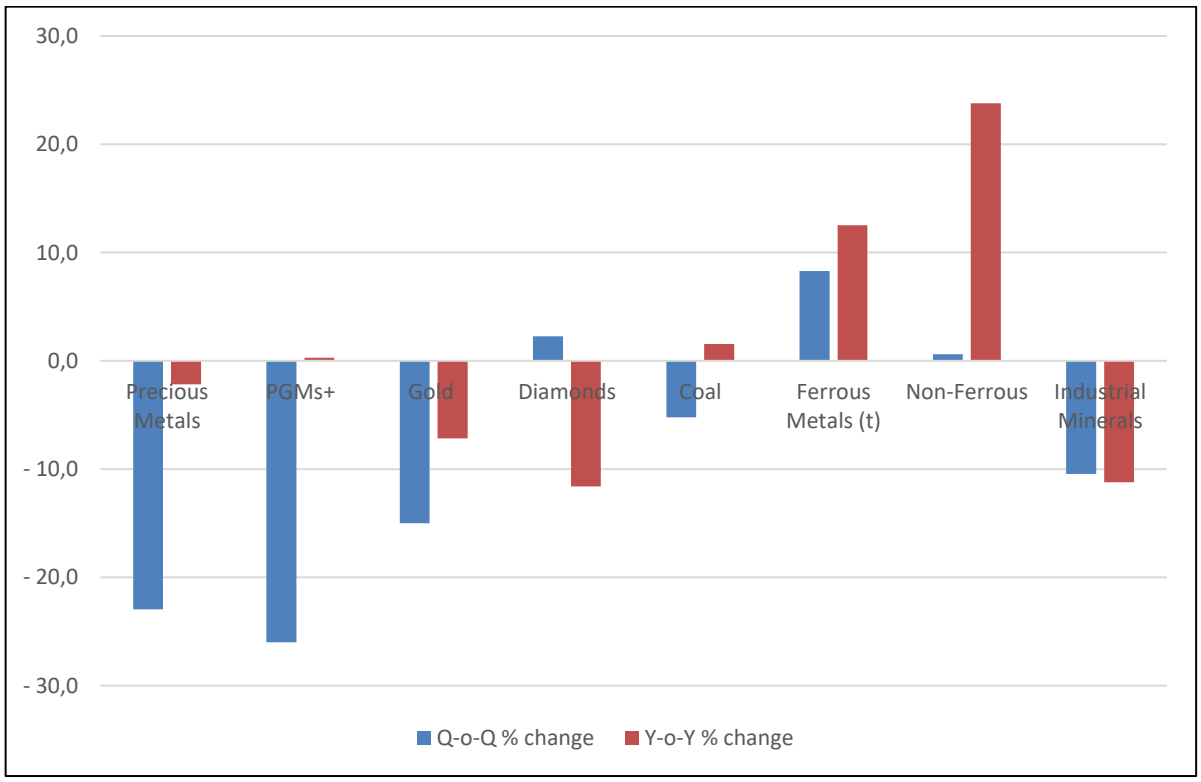
3. SOUTH AFRICA'S MINING SECTOR PERFORMANCE DURING THE FIRST QUARTER OF 2024.

Production

Preliminary Mineral Economics and Statistics was a decline in production on q-o-q, largely caused by precious metals, compounded by coal, except for ferrous, non-ferrous, and industrial minerals. Y-o-y also recorded a slight decline caused by the declined in precious metals (Figure 2).

- Precious metals production declined by 22.9% q-o-q and by 2.2 y-o-y to 81 881 Kg. The decline is primarily attributed to diminished feed stocks and maintenance issues plaguing the PGMs (-26%) sector, coupled with reduced gold throughput, having reduced by 15% and 7.2% on both q-o-q and y-o-y, respectively.

FIGURE 2: PERCENTAGE CHANGE IN PRODUCTION.



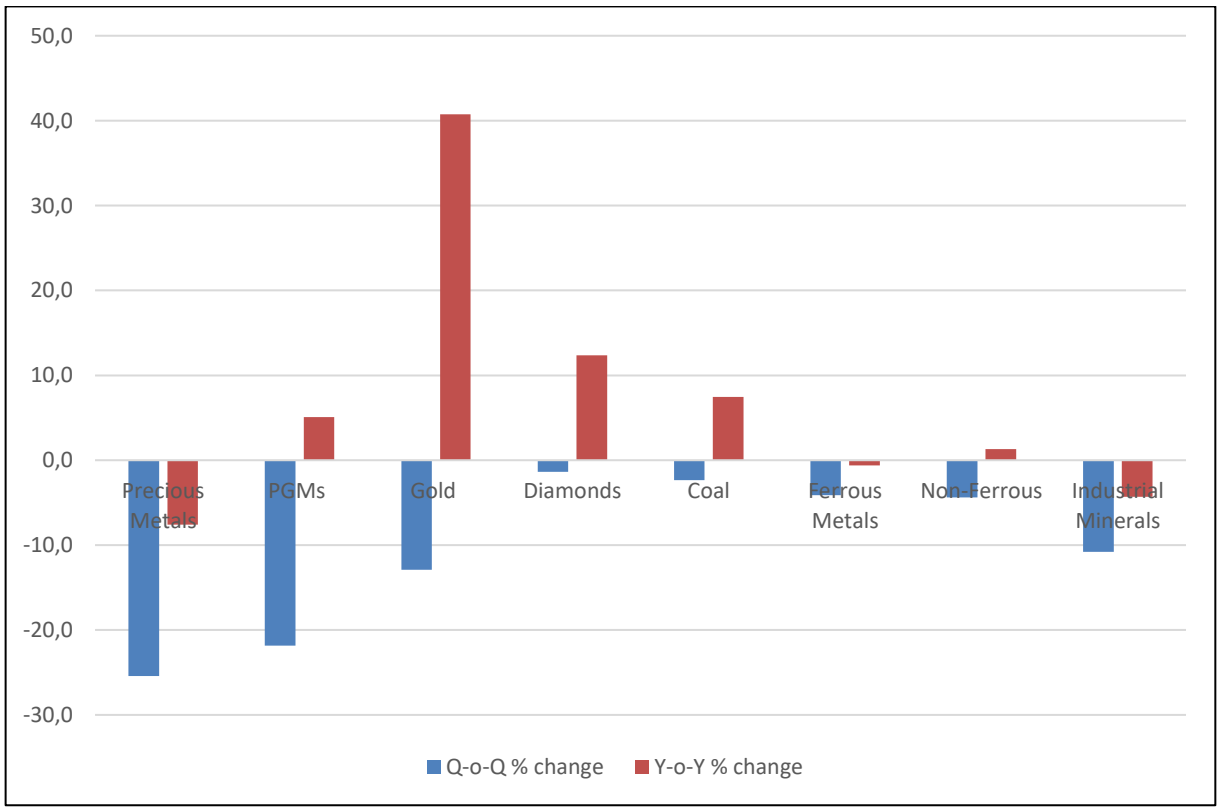
Source: DMRE, Mineral Economics and Statistics

- Total coal production dropped by 5.2% q-o-q to 55.2 Mt, due to some coal mines being placed on care and maintenance, while others ceased production. On a y-o-y basis, this represents an increase of 1.5%, as relatively more mines were producing in the first quarter of 2024, as compared to the same quarter of the previous year.
- Total ferrous production increased by 8.3% q-o-q to about 26 Mt, attributed to a notable 17.6% increase in iron ore, while both chrome and manganese ores recorded a decline at (-8.2%) and (-3.2%), respectively. On a y-o-y, total ferrous production grew by 12.5%, supported by increases in both the iron ore (18.3%) and chrome ore (13.3%), while manganese recorded a decline of 7%, in the period under review.
- Non-ferrous metals' production increased by a marginal 0.6% to 731 773 kt, due to the increase in output from the heavy minerals sector offsetting the loses recorded from other non-ferrous metals. On y-o-y, it grew by 23.8%, as most metals recorded higher output compared with the same period in 2023, except for lead (-9.5%) and for zinc (-52.9).
- Production of industrial minerals in the first quarter of 2024 decreased by 10.4 % q-o-q to about 20 Mt because of an unstable global economy and production delays.

Sales and sales value

Preliminary data shows that, total mining sales quantities recorded a decline across the sector, q-o-q. Y-o-y recorded a decline too, largely attributed to precious metals and ferrous metals (Figure 3). In line with sales decline, total sales revenue declined by 11.1% q-o-q and by 4.1% y-o-y to about R184 billion (Figure 4).

FIGURE 3: PERCENTAGE CHANGE IN SALES QUANTITIES.



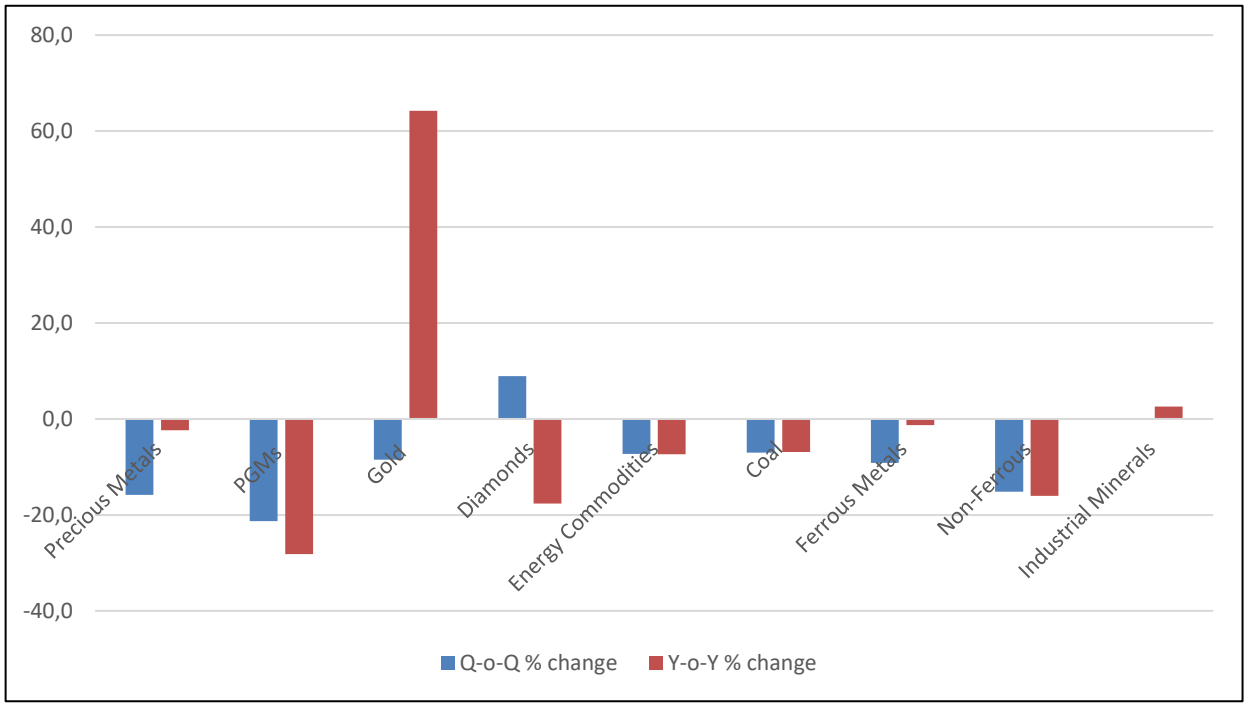
Source: DMRE, Directorate Mineral Economics and Statistics.

- Precious metals' total sales quantity declined by 25.4% q-o-q and by 7.6% y-o-y to 85 833 Kg, in line with lower output, due to reduced global demand, particularly for PGMs, which declined by 21.9%, compounded by gold also declining by 12.9%, in the period under review. The corresponding precious metals sales revenue declined by 15.8% q-o-q to about R70.2 billion, driven by 21.3% and 8.5% in

PGMs and gold sales revenue, respectively, in response to lower sales as well as lower prices for platinum and palladium. Y-o-y it declined by 2.3% attributed to a 28.1% decline in PGMs sales revenue at 28.1, which could not be offset by the 64.2% increase in gold revenue. Diamonds' sales volume declined by 1.4% and increased by 12.4% to a total of 1 361 828 carats. The corresponding diamonds' sale revenue increased 8.9% and declined by 17.6.% to about R3.8 billion. Thus, total precious commodities' sales revenue declined by 14.8% and by 3.3% to a total of about R73.9 billion.

- Total coal sales mass declined by 2.3% q-o-q to about 60.3 Mt. However, on a y-o-y basis this represented a 7.4% increase. The corresponding coal sales revenue declined by 7% q-o-q to about R45.3 billion, Y-o-y, it declined by 6.9%. The total energy commodities sales revenue declined by 7.3% q-o-q to about R45.3 billion, and y-o-y, it declined by 7.4%.
- Total ferrous metals sales quantity declined by 4.1% q-o-q and by a marginal 0.6% y-o-y to about 25.7 Mt. The drop in sales is notable across the sector q-o-q, while on y-o-y the drop in sales was due to a drop in iron ore (-2.1%), while manganese and chrome ore recorded increases of 3.3% and 0.6%, respectively, which was however, not sufficient to offset the decline in the sector.

FIGURE 4: PERCENTAGE CHANGE IN SALES VALUE.



Source: DMRE, Directorate Mineral Economics and Statistics.

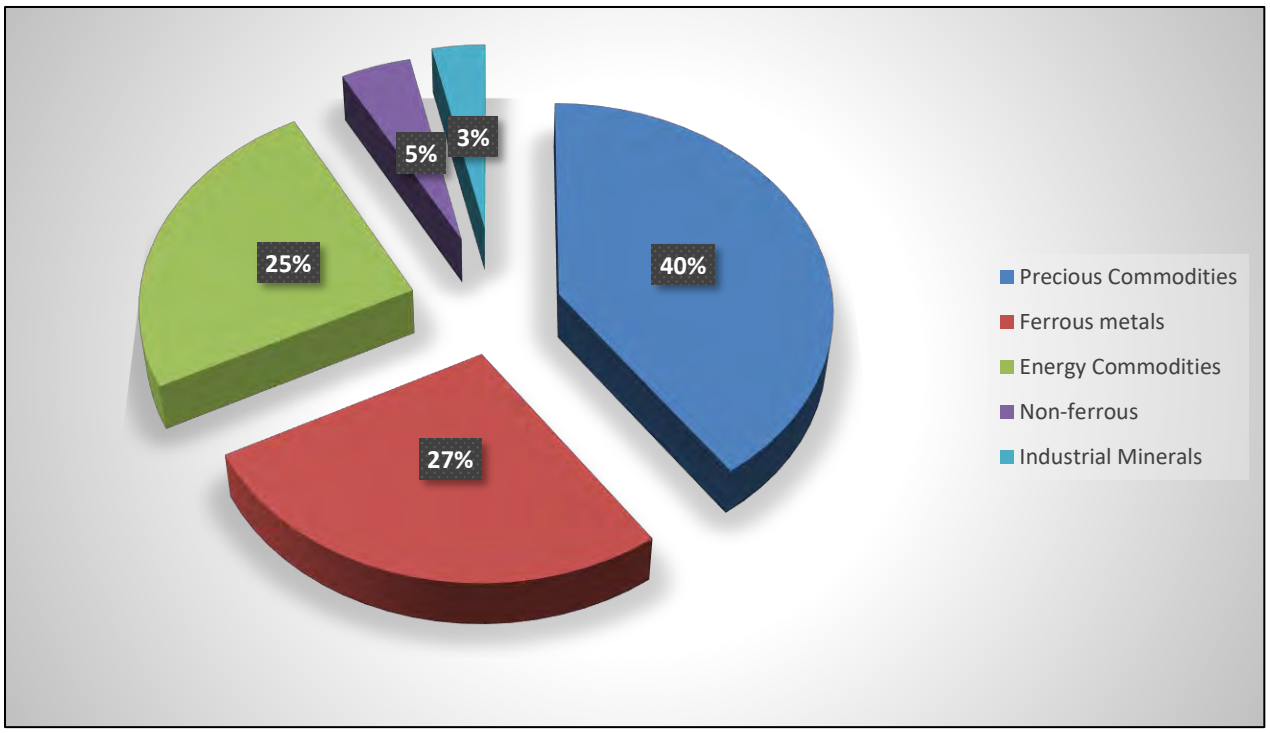
The corresponding sales revenue declined by 9.2% q-o-q and by 1.3% y-o-y to about R50.2 billion, due to lower sales and unit prices in the sectors, despite a weaker ZAR/US$ exchange rate, which was unable to offset the loss in sales.

- Sales mass for non-ferrous metals declined by 19.9% and 29.2% q-o-q and y-o-y to 553 948 kt, respectively, due to reduced production in the same period mostly from heavy mineral sands and zinc, compounded by lower ore grade ores and inconsistent production from responsible mines. The corresponding sales value declined by 11.8% and 24% q-o-q and y-o-y, respectively to about R9.4 billion, in line with declined sales.
- Industrial minerals total sales volume decreased by 10.8% q-o-q and by 4.3% y-o-y to about 18.7 Mt. The declines were due to higher construction costs including a rapid rise in interest rates, lack of demand of sales for granite and slate, reduced capacity for consumer demand emerging from limestone as well as quicklime for chemical uses. The corresponding total sales value increased slightly by 0.1% q-o-q to about R6.3 billion, as industrial minerals demand improves. On y-o-y, the sales revenue rose by 2.6%, on the back of higher volumes traded during the period under review.

Percentage contribution to value by commodity groups

In term of revenue contribution by commodity groups (Figure 5), the precious sector continued to lead the industry at 40%, equaling about R73.9 billion of the mining industry, largely attributed to PGMs at about R36.9 billion of that sector. Ferrous ferrous metals contributed about 27% valued at about R50.2 billion, largely attributed to iron ore at about R25.8 billion. Energy commodities contributed about 25% valued at about R45.3 billion, largely attributed to coal at close to R45.3 billion. Non-ferrous metals contributed 5% at about R8.3 billion. Industrial minerals contributed 3% valued at about R6.3 billion.

FIGURE 5: PERCENTAGE CONTRIBUTION BY SECTORS.



Source: DMRE, Directorate Mineral Economics and Statistics.

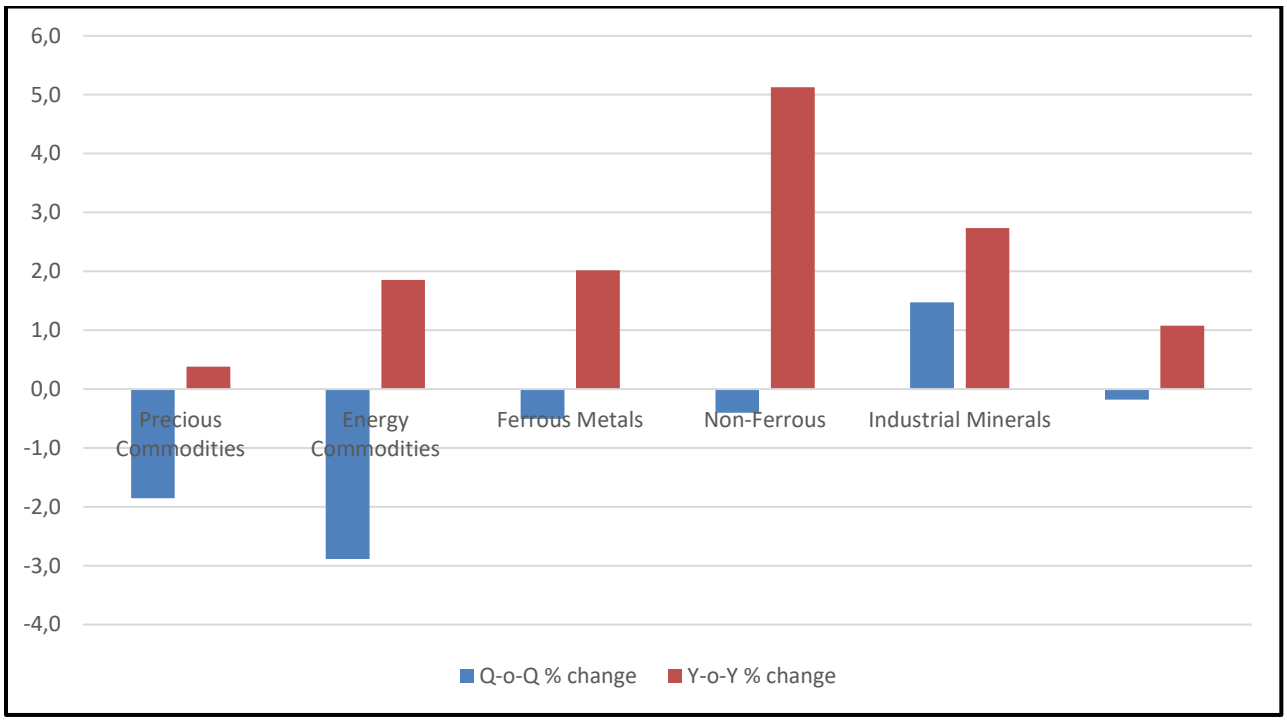
Employment and Remunerations

Total employment by the entire mining sector dropped by 1.9% q-o-q in the first quarter of 2024, to 286 447. The decline was driven by the declined across the various sectors except for industrial minerals sector (Figure 6). Y-o-y it increased 0.4%, attributed to the increase across the whole industry (Figure 6). The corresponding total remuneration for the whole sector declined by 1.8% q-o-q in the first quarter of 2024, to about R10 billion, in congruence with decline in the number of employees, q-o-q. On y-o-y basis, it increased by 6.6%, also in line with the increase in the number of employees across the sector.

Total employment by the precious commodities' sector dropped by 2.9% q-o-q in the first quarter of 2024, to 286 447. Y-o-y it increased 1.9%. Total remuneration for the precious commodities' sector declined by 0.6% q-o-q in the first quarter of 2024, to about R10 billion.

Total employment by the energy commodities' sector dropped by 0.5% q-o-q in the first quarter of 2024, to 97 317. Y-o-y it increased 1.5%. The corresponding remuneration for the Energy commodities' sector declined by 2.8% q-o-q in the first quarter of 2024, to about R3 billion. On y-o-y basis, it increased by 10.6%, in line with the number of employees.

FIGURE 6: PERCENTAGE CHANGE IN EMPLOYMENT PER SECTOR.



Source: DMRE, Directorate Mineral Economics and Statistics.

Total employment by the Ferrous metals' sector declined by a marginal 0.4% q-o-q in the first quarter of 2024, to 58 653. Y-o-y it increased 5.1%. The corresponding remuneration for the ferrous metals' sector declined by 2.3% q-o-q in the first quarter of 2024, to about R1.9 billion, in line with the decline in the number of employees. On y-o-y basis, it increased by 13.6%, attributed to the increase in number of employees.

Total employment by the non-ferrous metals' sector increased by 1.7% q-o-q in the first quarter of 2024, to 17 055. Y-o-y it increased 2.7%. Total earnings for non-ferrous minerals decreased by 9.8 percent to R2.1 billion in Q1 2024, attributed to the payment of bonuses at Nkomati and Palabora Copper mines in Q4 2023. Y-o-y, non-ferrous minerals earnings declined by 11.6 percent.

Total employment by the Industrial minerals' sector declined by a marginal 0.2% q-o-q in the first quarter of 2024, to 18 007. Y-o-y it increased 1.1%. The corresponding remuneration for the Industrial minerals' sector declined by 4.6% q-o-q in the first quarter of 2024, to about R453.5 million. On y-o-y basis, it increased by 10.9%.

Outlook

Poor rail infrastructure and Transnet's logistical challenges including locomotive availability, cable theft, rail vandalism and port delays, continue to weigh on the mining sector, especially for bulk commodities such as coal and iron ore, that are destined for export. While Transnet has developed partnership with private sector to address cable theft and vandalism on the freight rail network through advanced technologies and additional security personnel, it will take long before the interventions begin to bear significant fruits for the sector. While electricity loadshedding remains a binding constraint on economic recovery, with power supply interruptions, April 2024 began to see a significant improvement with power supply without any interruptions, going into May 2024. Thus, it is expected that, that electricity availability will result in improved production on both quarter-on-quarter as well as year-on-year.it is thus envisaged that improvement in production will translate into healthy sales volumes and improved corresponding sales revenue in the second quarter, supported by a weak ZAR/ US$ exchange. In terms of employment and

remuneration, it is envisaged that there will be a slight increase in both, on the back of improved electricity availability.

Mineral Economics and Statistics.

4. SOUTH AFRICA'S PRECIOUS METALS AND MINERALS SECTOR'S PERFORMANCE DURING THE FIRST QUARTER OF 2024.

South Africa's precious metals production was estimated at 81.8 tons (t) (Figure 7 and Table 1) in the first quarter of 2024 (Q1 2024), with Platinum Group Metals (PGMs) contributing 64.0 percent to total production, while gold and silver contributed 25.2 percent and 10.5 percent, respectively. Production remained relatively flat at an increase of 0.3 percent q-o-q. The decline is primarily attributed to diminished feed stocks and maintenance issues plaguing the PGMs sector, coupled with reduced gold throughput. Precious metals total sales mass at 82.8 t, experienced a notable decrease of 25.4 percent, driven by lower combined precious output on the back of the December holidays. Precious metal's revenue reached R70.2 billion, contributing just over 38.1 percent to total mining revenue, thus making a significant impact on the sector. Total revenue generated from the precious sector saw a significant decrease of 15.8 percent, q-o-q, despite a weaker R/$ exchange rate. The fall is caused by a drop in palladium and ruthenium prices of 6.2 percent and 4.6 percent, respectively, coupled with lower gold export sales, countering gold price gains. Similarly, despite a 7.3 percent weaker exchange rate, precious sales revenue experienced a decrease of 2.3 percent, y-o-y, mainly due to markedly weaker PGE prices, coupled with subdued gold exports.

TABLE 1: SOUTH AFRICA'S PRECIOUS METALS PRODUCTION, Q1 2024

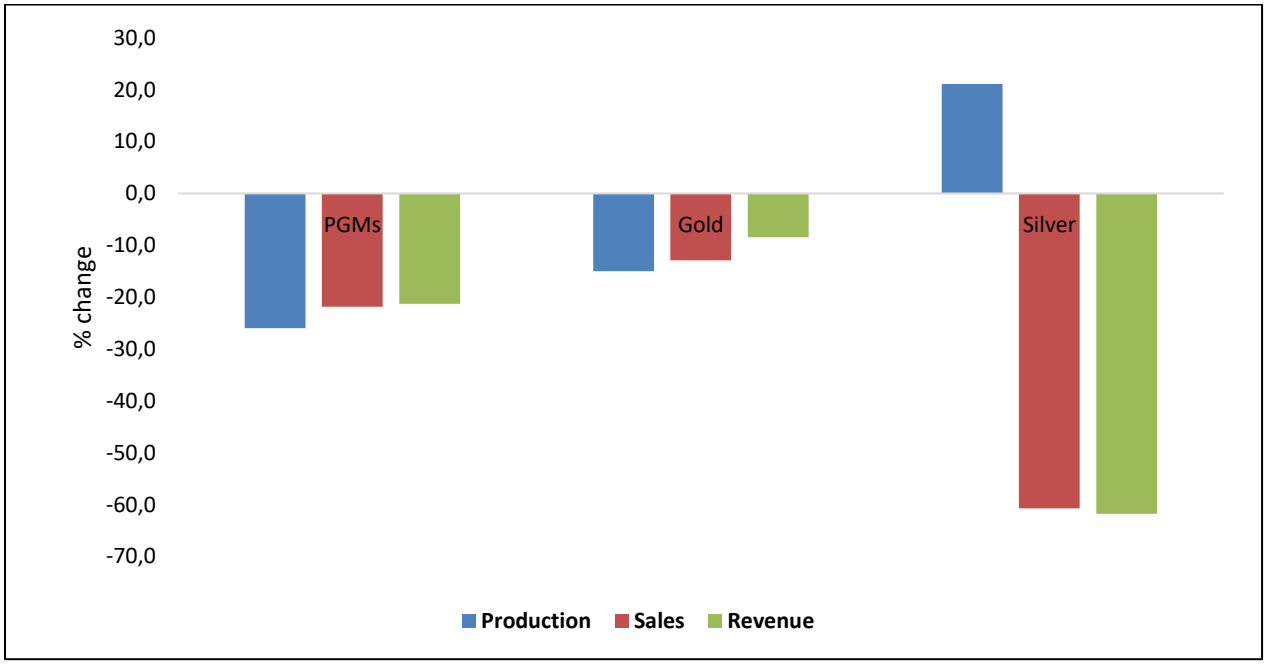
Precious	Production	Local Sales		Export Sales		Total Sales	
	Quantity	Quantity	Value (R' mil)	Quantity	Value (R' mil)	Quantity	Value (R' mil)
Q1 2024	81 881	3 488	3 013.4	79 345	67 181.0	82 833	70 194
Q4 2023	106 257	3 884	3 514.8	107 178	79 847.3	111 062	83 362
Q1 2023	83 687	3 671	4 131.8	85 956	67 745.3	89 627	71 877
Q-O-Q	*-22.9*	*-10.2*	*-14.3*	*-26*	*-15.9*	*-25.4*	*-15.8*
Y-O-Y	*-2.2*	*-5*	*-27.1*	*-7.7*	*-0.8*	*-7.6*	*-2.3*

Source: DMRE Mineral Economics and Statistics 2023, Q1 2024

PGMs production at 52.4 t, experienced a notable decrease of 26.0 percent, q-o-q, due to low feed stocks at some operations due to the holiday break, as well as operational curtailment at Pilanesberg in January. In addition, Amplats underwent temporary care and maintenance, further impacting production. In contrast, PGMs production saw a modest increase of 0.3 percent, y-o-y, largely driven by the release of inventory-in-pipeline by Amplats. PGMs sales quantity decreased by 21.9 percent, q-o-q due to lower available throughput of 4 Platinum Group Elements (4PGE). This scarcity notably impacted physical PGMs sales availability. In contrast, PGMs production increased by 5.1 percent, y-o-y. This was primarily due to Amplats' release of stock in March, which offset production challenges at Implats and Mogalakwena. There Russian stocks of palladium released on the international market distorted export sales mass, q-o-q and y-o-y.

Gold production averaged at 20.9 t, decreasing by 15.0 percent and 7.2 percent, q-o-q and y-o-y, respectively, due to reduced output at major operations as a result of long summer holidays over the festive season. This is a recurring trend typically observed in the first quarter of each year. Gold sales mass decreased by 12.9 percent q-o-q in response to low output and reduced global demand, with Rand Refinery recording a 13.3 percent decrease in fine gold, while Northam Platinum recorded a 5.4 percent decrease in gold as a by-product. Despite the production decline, y-o-y gold sales volume increased by 40.7 percent, driven by the annual average gold price rise and strong international demand.

FIGURE 7: PRECIOUS MINERALS PRODUCTION AND SALES QUARTERLY % CHANGES



Source: DMRE, Mineral Economics and Statistics.

Revenue generated by the PGMs sector, witnessed a decrease of 21.3 percent, q-o-q in response to lower sales coupled with a marginal 0.2 percent drop in 5 PGE prices, despite the weaker ZAR/US$ exchange rate. Despite higher sales and a weaker exchange rate, revenue fell by 28.1 percent, y-o-y, due to lower 5 PGE basket price, which plummeted by almost 37 percent in the same period. Revenue generated by the gold sector decreased by 8.5 percent q-o-q due to lower volume of sales, despite a weaker ZAR/US$ exchange rate (Figure 8 and Table 2) and bullish gold prices, which were unable to offset the loss in sales revenue. Y-o-y gold revenue increased by 64.2 percent, primarily driven by a high sales volume, coupled with a weaker rand-to-dollar exchange rate and high gold prices.

TABLE 2: PRICES OF PRECIOUS METALS: Q1 2024

Periods	Gold	Silver	Pt	Pd	Rh	Ir	Ru	5 PGE	*R/$ Exchange*
Q1 2024	2 072.44	23.36	920.70	962.44	4 494.47	4 977.20	440.45	2 359.05	18.9050
Q4 2023	1 976.78	23.23	925.20	1 026.39	4 460.40	4 948.50	461.84	2 364.47	18.7573
Q1 2023	1 888.22	22.55	1 006.72	1 592.09	11 002.08	4 617.46	465.79	3 736.83	17.6216
Q-O-Q	***4.8***	***0.5***	***-0.5***	***-6.2***	***0.8***	***0.6***	***-4.6***	***-0.2***	***0.8***
Y-O-Y	***9.8***	***3.6***	***-8.5***	***-39.5***	***-59.1***	***7.8***	***-5.4***	***-36.9***	***7.3***

Source, DMRE Mineral Economics and Statistics 2024, Q1

TABLE 3: PRECIOUS EMPLOYMENT AND REMUNERATION, Q1 2024

PERIOD	EMPLOYEES	REMUNERATION	REMUNERATION/EMPLOYEE
		Rands' 000 000	Rands
Q1 2024	271 466	28 167	103.8
Q4 2023	279 415	28 222	101.0
Q1 2023	274 216	27 072	78.9
QQ % change	***-2.8***	***-0.2***	***2.7***
YY% change	**1.9**	**4.2**	**5.4**

Source: DMRE Mineral Economics and Statistics, Q1 2024

Precious sectors employment averaged at 271 466 employees in Q1 2024 (Table 3) contributing 56.9 percent to the total precious mining labour force in South Africa. The PGMs sector at 66.2 percent, was the largest contributor to the precious labour force, followed by gold at 33.8 percent.

Precious sector employment and remuneration decreased by 2.8 percent and 0.2 percent q-o-q, respectively. The increase in employment is notable from the gold and PGMs sectors, however despite gold remuneration increasing by 0.7 percent it was not enough to offset the 0.6 percent drop in PGMs remuneration. Y-o-y, employment increased by 1.9 percent; supported by an increase in contractual workers due to PGMs expansion projects. Remuneration increased by 5.4 percent in line with increased number of employees, also supported by bonus and STR payments at major gold and PGMs operations.

Outlook

In Q2 2024, the platinum group metals (PGMs) market is expected to remain in deficit, due to ongoing supply challenges including the production curtailment as Pilanesberg Mine. Primary platinum supply is forecasted to decrease by 2 percent, with significant production difficulties in South Africa, while palladium supply is anticipated to be tight, influenced by the rise of Battery Electric Vehicles (BEVs) and increased use of platinum in gasoline autocatalysts. Platinum is projected to trade between $800/oz and $1,100/oz, palladium between $700/oz and $1,200/oz, and rhodium between $3,500/oz and $6,500/oz. Gold production faces challenges from declining ore grades and higher costs, yet high prices around $1,715/oz are encouraging increased production efforts. Demand for autocatalytic converters in China is expected to see significant growth from 2021 to 2024, with platinum gross demand in the automotive sector increasing from 373 koz in 2021 to 613 koz in 2023, reflecting a year-on-year growth of 38.4 percent. In comparison, North America's demand grew by 8.0 percent, Western Europe by 13.3 percent, and Japan by 19.3 percent over the same period.

Sources:

1. *DMRE: Mineral Economics and Statistics, Q1 2024*
2. *SARB, Statistical data, archived, Q1 2024*
3. *Johnson Matthey.com, Q1 2024*
4. *World Platinum Investment Council, Q1 2024*
5. *World Gold Council Counsel.*
6. *Direct communication with PGMs and Gold producing mines.*

P. J Perold & V Mutavhatsindi

5. AN ANALYSIS OF MINIMUM PGM PRICES FOR PROFITABILITY

The importance of a multi-commodity production approach in ensuring the economic stability of mining operations.

The viability of platinum group metals (PGMs) mining operations hinges on their ability to cover production costs and achieve profitability under current market conditions. This article examines the factors influencing the economic sustainability of PGMs mines, focusing on their prices for viability, and the impact of base metal and chrome production. The analysis considers data from mines located in the Bushveld Complex's Western, Eastern, and Northern limbs.

The minimum PGMs price for viability is the threshold price at which PGMs (Platinum, Palladium, Rhodium) should be sold to cover costs and achieve profitability. Average minimum PGMs price for viability, is R379 444/kg, which represents the critical price point at which mining operations can continue to operate profitably. Mines that produce additional minerals as by-products benefit from the additional revenue, as these by-products lower the minimum viable PGMs price, making those mining

operations more resilient to market fluctuations. Additional revenue generated from these by-products is, therefore, vital for ensuring the mine's viability and stability.

At an average price of R10.50/kg, the income from chrome can significantly offset the operational costs of PGMs extraction. Consequently, these mines can maintain profitability even if PGMs prices fall below their primary cost thresholds. In addition, base metals such as nickel and copper provide supplementary revenue streams that help lower the break-even point for PGMs prices. Consistent prices of nickel (R396.44/kg) and copper (R125.36/kg) significantly contribute to the overall income of PGM mines. Market fluctuations significantly impact both by-product and PGMs revenue. For example, a drop in PGMs prices would raise the importance of revenue from nickel, copper, and chrome, as these by-products could help cover the shortfall. Conversely, an increase in PGM prices would reduce reliance on by-products revenue, allowing the mine to achieve profitability more easily.

Calculations for minimum prices show the interplay between PGMs and chrome. If chrome prices were to drop below R10.50/kg, the minimum viable PGM price would need to rise to maintain profitability. Conversely, if PGM prices fell below R379 444/kg (Table 1), increased chrome revenue would become essential. This balance underscores the importance of a multi-commodity production approach, in ensuring the economic stability of mining operations.

The Bushveld Complex mines analysed include the Mogalakwena Mine (Northern Limb), Rustenburg Mine (Western Limb), Marikana Mine (Western Limb), Kroondal Mine (Western Limb), Amandelbult Complex (Western Limb), Tharisa Mine (Western Limb), Bokoni Mine (Eastern Limb), and Two Rivers Mine (Eastern Limb). Each of these mines produces a combination of PGMs and base metals, with several also producing chrome, as by-products.

TABLE 4: SUMMARY OF AVERAGE FIGURES FROM KEY PGM MINES AND COMMODITY PRICES (APRIL 2024).

Mineral produced	**Minimum PGM Price for Viability**
PGMs (Platinum, Palladium, Rhodium)	R379 444/kg
Base Metals Produced	
Nickel	R396.44/kg
Copper	R125.36/kg
Chrome	R10.50/kg

Source: Breakeven calcs from Dibenja SEZ, Western and Eastern Limb, averages

In conclusion, the analysis underscores the intricate interplay between PGMs prices, base metals, and chrome prices, in determining the economic viability of PGMs mining operations. With the average minimum PGMs price for profitability set at R379 444/kg, mines leveraging chrome production enjoy a reduced break-even threshold, highlighting the importance of diversifying revenue streams. Moreover, the stability provided by consistent prices of base metals like nickel and copper further bolsters overall income resilience. This comprehensive understanding of economic dynamics within the PGMs mining sector empowers stakeholders to navigate market fluctuations effectively, ensuring long-term sustainability and adaptability in the face of evolving industry landscapes.

References:

1. *Data on PGM and base metal production prices derived from internal industry reports.*
2. *Market prices for chrome, nickel, and copper sourced from recent commodity market analyses. Sibanye-Stillwater, Northam Platinum, Implats and others.*
3. *Viability threshold analysis based on financial models of PGM mining operations in the Bushveld Complex. Information sourced from annual reports.*

P. J Perold

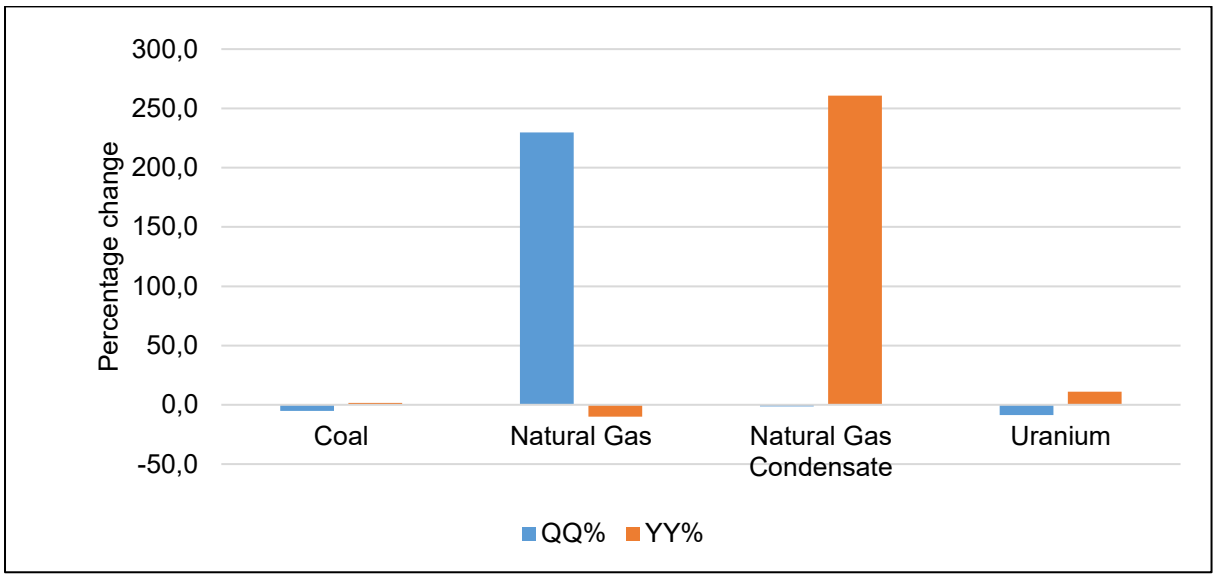
6. SOUTH AFRICA'S ENERGY COMMODITIES SECTOR'S PERFORMANCE DURING THE FIRST QUARTER OF 2023.

Production

The latest quarterly data released by the DMRE shows that South African coal production decreased by 5.20 percent q-o-q to 55.22 million tons (Mt), due to several mines ceasing production and some put on care maintenance. However, on a y-o-y basis, this represents a 1.5 percent increase as overall more mines were producing in the first quarter of 2024 compared to the same quarter the previous year (Figure 9 and Table 5).

Natural gas production surged up by 229.6 percent q-o-q and fell by 10.0 percent y-o-y to 1,012 tons(t), fuelled by improved output from Tetra4 gas facility. Production from Tetra4's Virginia gas plant was disturbed by maintenance in the 4th quarter of 2023, leading to lower output. The plant's operations were restarted in February 2024. Natural gas condensate production declined slightly by 1.3 percent q-o-q and swung up by 260.8 percent y-o-y to 451t. The decline was due to lower output from the Petroleum and Oil Corporation of South Africa (PetroSA), while the increase was due to maintenance carried out in Q1 2023 (Figure 8 and Table 5).

FIGURE 8: PRODUCTION OF ENERGY MINERALS, Q1 2024.



Source: DMRE Mineral Economics and Statistics.

TABLE 5: PRODUCTION OF ENERGY MINERALS, Q1 2024.

Commodity (t)	Q1 2024	Q4 2023	Q1 2023	QQ%	YY%
Coal	55 229 049	58 258 814	54 387 576	**-5,2**	**1,5**
Natural Gas	1 012	307	1 125	**229,6**	**-10,0**
Natural Gas Condensate	451	457	125	**-1,3**	**260,8**
Uranium	63 605	69 655	57 210	**-8,7**	**11,2**

Source: DMR, Mineral Economics and Statistics.

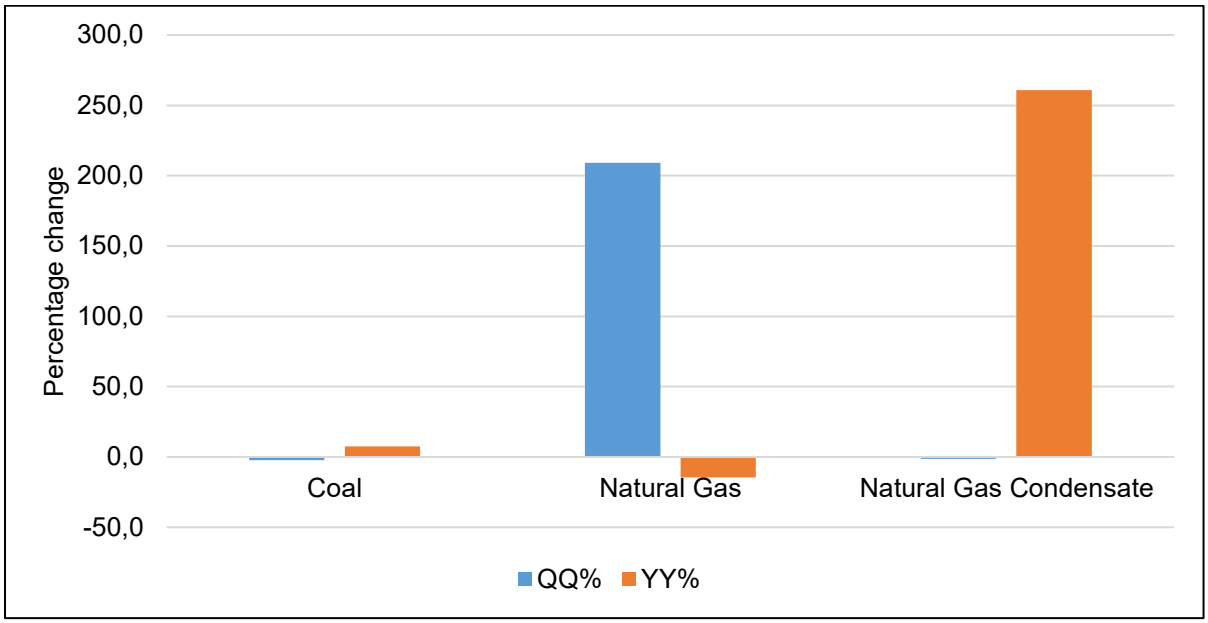
The level of uranium production is influenced by gold output from Moab Operations, as the commodity is being produced as a by-product. Uranium production decreased by 8.7 percent q-o-q and grew by 11.2 percent y-o-y to 63.6t.

Total Sales

Subdued demand from the international market, especially from the power generation driven by high inventory levels led to a 2.3 percent decline in coal total sales q-o-q, to 60.25 Mt. On a y-o-y basis this was a 7.4 percent increase as more coal was consumed by South Africa's electricity generation industry in the first quarter of 2024 compared to the previous year, compensating for the declined exports (Figure 9 and Table 5).

Natural gas' total sales volume grew by 209.1 percent q-o-q and fell by 14.7 percent y-o-y to 949t, attributed to improved sales from Tetra4 gas facility. Natural gas condensate total sales volume slowed by 1.3 percent q-o-q and surged up by 260.8 percent y-o-y, to 451t, attributed to production realized from PetroSA during the period under review (Figure 9 and Table 5). All the produced natural gas and natural gas condensate are sold domestically, as the country does not have enough local production to cover domestic demand. There were no uranium sales reported during the period under review.

FIGURE 9 TOTAL SALES QUANTITY OF ENERGY MINERALS, Q1 2024.



Source: DMRE Mineral Economics and Statistics.

Total Revenue

Total revenue generated from coal sales decreased by 7.0 percent q-o-q and 6.9 percent y-o-y to R45.29 billion owing mainly to soft demand from the international market driven by various country emission reduction programmes worsened by low coal prices (Figure 10 and Table 6).

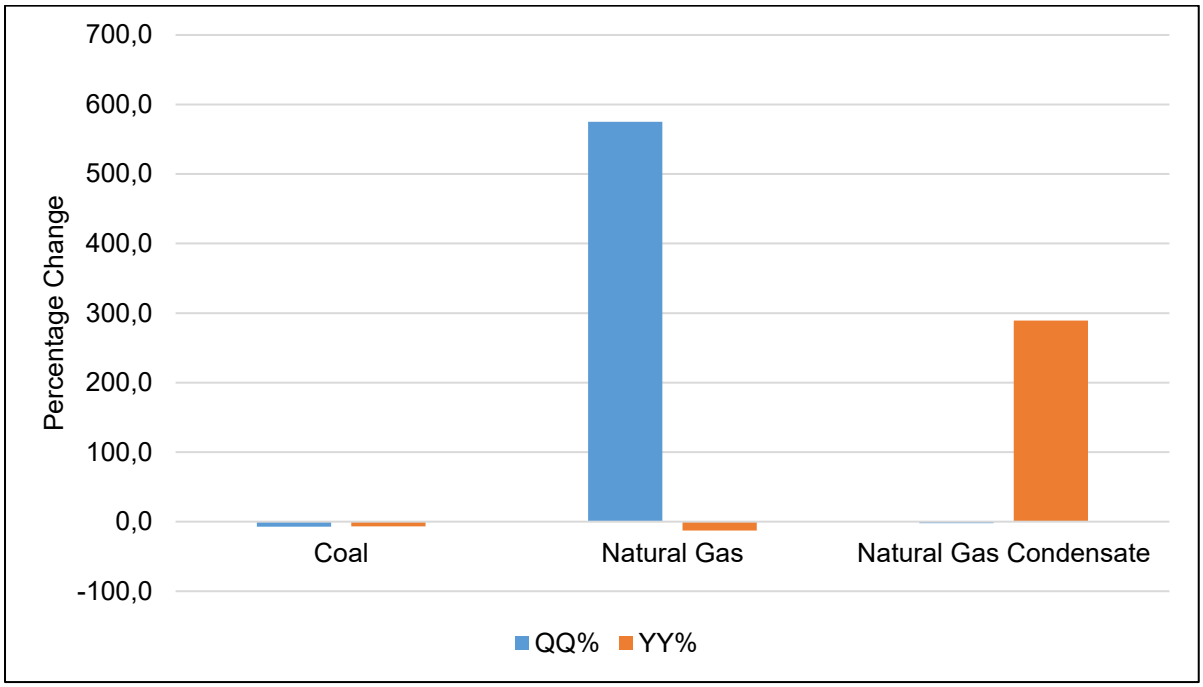
Natural gas revenue grew more than five times registering a 575.2 percent increase q-o-q to R7,791,371. However, it declined by 12.7 percent y-o-y. Natural gas condensate total sales revenue decreased by 2.2 percent q-o-q and increased 289.4 percent y-o-y to R7,854,003 (Figure 10 and Table 6). The increase or decrease of the revenue for both commodities can be attributed to the sales mass and unit prices realised during the period under review.

TABLE 6: TOTAL REVENUE OF ENERGY COMMODITIES, Q1 2024.

Commodity (R')	Q1 2024	Q4 2023	Q1 2023	Q-o-Q%	Y-o-Y%
Coal	45 291 468 238	48 726 629 907	48 651 468 345	-7,0	-6,9
Natural Gas	7 791 371	1 153 881	8 923 909	575,2	-12,7
Natural Gas Condensate	7 854 003	8 031 618	2 016 764	-2,2	289,4
Uranium	0	120 623 306	250 746 797	-100,0	-100,0

Source: DMR, Mineral Economics and Statistics.

FIGURE 10: TOTAL REVENUE OF ENERGY COMMODITIES, Q1 2024.



Source: DMRE Mineral Economics and Statistics.

Prices

The unit prices of domestic coal declined by 3.0 percent q-o-q and 0.5 percent y-o-y to R600 /t owing mainly to lower demand from the Industrial, Synthetic Fuels and metallurgical consumption. Similarly, export coal prices plunged by 17.3 percent q-o-q and 58.5 percent y-o-y to R1 487 /t due to sluggish demand from the international market, especially Europe (Figure 11 and Table 7). The occurrence of the warmer-than-anticipated weather conditions led to decreased consumption as well as climate change imperatives of various countries. The ongoing accumulation of coal stockpiles in India and weaker demand in Europe played a significant role in driving the export prices down.

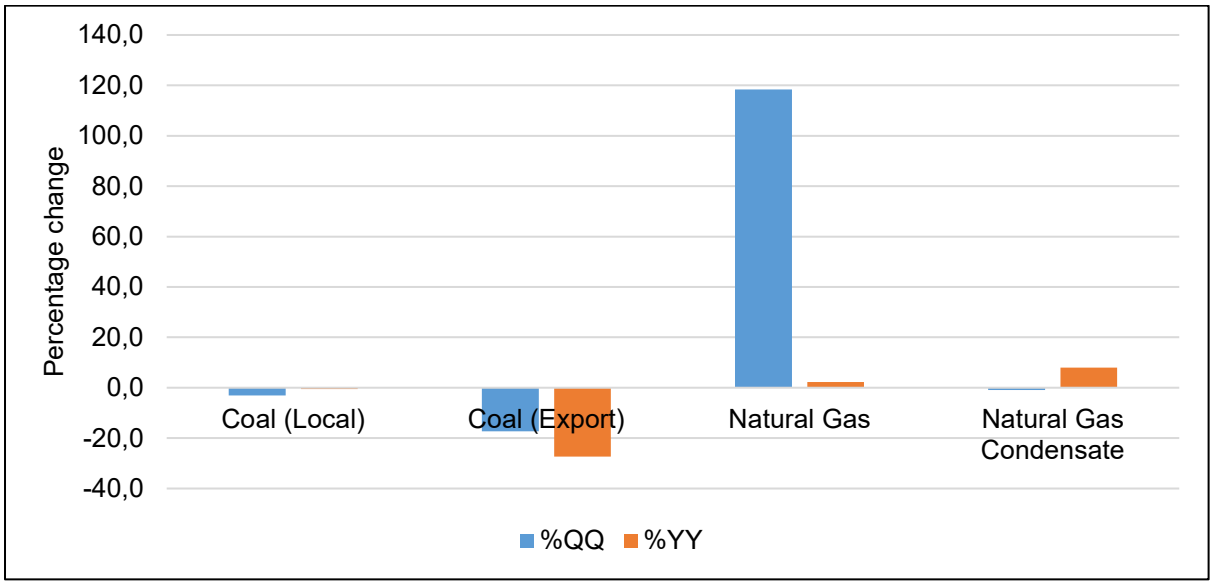
The unit price for natural gas increased by 118.4 percent q-o-q and 41.1 percent y-o-y to R8,210/t. Natural gas condensate unit price fell marginally by 0.9 percent q-o-q and increased by 58.1 percent y-o-y to R17,415/t (Figure 11 and Table 7). The decrease and increase in the unit prices for natural gas and natural gas condensate respectively can be attributed to demand and different mechanisms used to calculate the prices by the producers.

TABLE 7: PRICES OF ENERGY COMMODITIES, Q1 2024.

Commodity (R')	Q1 2024	Q4 2023	Q1 2023	%Q-o-Q	%Y-o-Y
Coal (Local)	600	618	603	**-3,0**	**-0,5**
Coal (Export)	1 487	1 799	3 585	**-17,3**	**-58,5**
Natural Gas	8 210	3 759	5 820	**118,4**	**41,1**
Natural Gas Condensate	17 415	17 575	11 013	**-0,9**	**58,1**
Uranium	0	4 091	8 210	**-100,0**	**-100,0**

Source: DMRE, Mineral Economics and Statistics.

FIGURE 11: AVERAGE PRICES OF ENERGY COMMODITIES, Q1 2024.

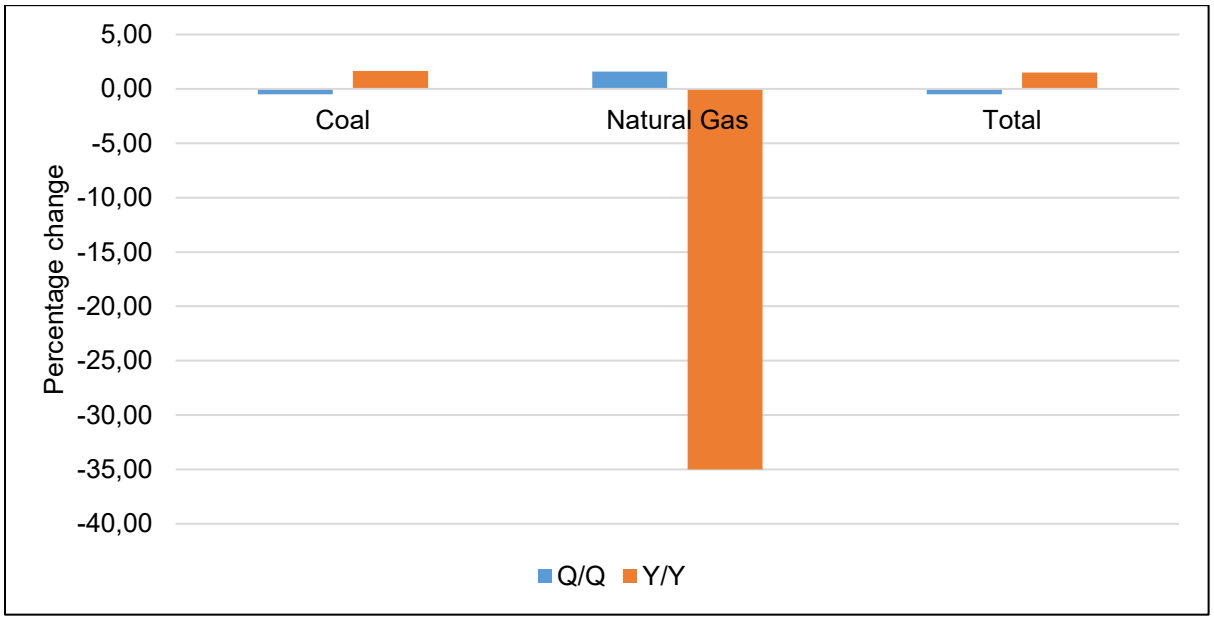


Source: DMRE Mineral Economics and Statistics.

Employment

Total employment in the energy sector fell slightly by 0.51 percent q-o-q and increased by 1.50 percent y-o-y to 97,317 employees, mainly driven by employee numbers from the coal sector (Figure 12). The coal industry accounts for more than 98 percent of labour from the energy commodities, while the remaining balance comes from the natural gas sector. Total employment in the coal sector fell by 0.51 percent q-o-q and grew by 1.65 percent y-o-y to 97 060, as some mines stopped production or were put on care and maintenance. However, on a y-o-y basis this was a marginal 1.65 percent increase due to an increase in the number of mines producing, in the first quarter of 2024 compared with the same period in 2023.

FIGURE 12: TOTAL EMPLOYMENT OF ENERGY COMMODITIES, Q1 2024.



Source: DMRE Mineral Economics and Statistics.

Natural gas sector total employment went up by 1.58 percent q-o-q and declined by 34.99 percent y-o-y to 257 employees. The increase and decrease in natural gas sector employees' number was influenced by the number of employees reported by Tetra4 gas facility because the facility laid off a significant number

of contractors following the completion of its Virginia gas plant in 2023. No employment was reported from the uranium sector during the period under review. The only mine (Shiva Uranium) that produces uranium directly is still under business rescue.

Earnings in the energy sector increased by 19.35 percent q-o-q and 7.67 percent y-o-y respectively to R8.97 billion, boosted by the bonuses paid out at several coal mines and the increase in earnings in the natural gas industry.

Outlook

It is predicted that coal production will remain at current levels or decline further in the second quarter of 2024, as some mines will temporarily halt production in response to lower demand. The weaker international demand and high inventory levels in importing countries will sustain the downward trend in the country's coal export prices.

South Africa's natural gas production is expected to hover above 1 500t in the second quarter of 2024, driven by output from Tetra4 gas facility. However, the downside to the prediction could be that production from PetroSA could experience low output due to declining reserves from the company's offshore production facilities. Natural gas condensate production is anticipated to remain above 400t in the second quarter of 2024. Uranium production will be guided by Moab Operations' gold production and its demand.

Sources*:*

1. *DMR, Mineral Economics, and Statistics Directorate.*
2. *https://www.iol.co.za/business-report/companies/renergen-pushing-towards-full-production-after-maintenance-a6a9a627-00ae-4ec6-a674-855c5fb13286*
3. *https://www.chemanalyst.com/NewsAndDeals/NewsDetails/global-coal-sector-faces-supply-demand-fluctuations-impacting-market-dynamics-27242*

KL Revombo & KJ Tshetlhanyane

7. THE FUTURE OF COAL IN THE SOUTH AFRICAN ECONOMY

Can the introduction of technology reshape the country's energy economics?

Coal has long been a cornerstone of global energy production, fuelling industrial revolutions and powering economies around the world. The South African coal industry has a storied past, having been a crucial part of the country's economy for generations. From its early days powering steam engines to fuelling modern day power plants, coal is the cornerstone of South Africa's energy sector. However, as concerns over environmental impact and climate change continue to escalate, the future of coal is increasingly uncertain. Coal mining can have detrimental impact on the environment, leading to land degradation, deforestation, and contamination of water sources. The extraction and transportation of coal can disrupt ecosystems and harm local communities. Burning coal releases pollutants such as sulphur dioxide, nitrogen oxides, and particulate matter into the atmosphere, contributing to air pollution and climate change. Coal-fired power plants are among the largest sources of greenhouse gas emissions globally. This has led to nations around the globe committing to reducing greenhouse gas (ghg) emissions to curb its impact. However, many developing nations still rely on coal as a primary source of energy, especially its use in power generation.

South Africa, as one of the high ghg emitters in the continent, emitting approximately 470 million tonnes of carbon dioxide (CO_2) a year, has investigated and will employ the carbon capture, utilisation and storage (CCUS) technology with the aim to capture carbon dioxide emissions and store them underground. Following extensive geological mapping, the country has identified the town of Leandra in Mpumalanga province, which is in proximity of several coal-fired power stations and Sasol's coal to liquid (CTL) plant

as the country's CCS pilot site. It is anticipated that over 85 percent of carbon dioxide emissions from power plants and industrial facilities could be captured with this technology. Council for Geoscience (CGS), a government entity has partnered with Sasol in exploring and developing CCUS potential in South Africa. This is an advantageous public-private partnership that will tap into the expertise and experience of both sectors, in the deployment of CCUS research and innovation, building towards commercial viability and scalability in the country. In May 2024, CGS and Mzansi Exploration, Drilling and Mining celebrated the completion of the drilling of the 1800m CCUS borehole in a period of seven months. The use of this technology is one of the interventions the country is implementing to reduce emissions to meet South Africa's climate change commitments to reduce its carbon dioxide emissions by 50 percent, aligned to the Paris Agreement, while prolonging coal usage.

In addition, South Africa is in a process of diversifying its energy mix with the introduction of renewable energy sources like solar and wind power into the country's energy sources; this will help minimise South Africa's reliance on coal as well as offset tons of carbon emissions annually, while improving overall energy efficiency. Hybrid power plants that combine coal with renewables offer a more sustainable approach to energy generation. The declining costs of renewable energy technologies make them increasingly competitive and in the long term, will match coal costs.

The future of coal in the current South African energy sector needs to balance energy demands with environmental stewardship in the medium term, as the country is transitioning. In the long term, renewable energy sources are expected to match or even surpass coal in terms of cost-effectiveness. As renewable energy becomes more affordable and accessible, the economic viability of transitioning away from coal becomes more apparent. By embracing a diversified energy mix that includes renewables, South Africa can reduce its emissions and move towards a more sustainable energy future. As technological advancements and shifting market forces continue to reshape the energy sector, South Africa also has to move with global changes. By considering the various opportunities, stakeholders can make informed decisions that pave the way for a sustainable and resilient energy future for the country. As the country navigates through this transition, it is clear that coal's role will evolve, reflecting the broader shifts towards cleaner and more sustainable energy sources.

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K L Revombo

8. SOUTH AFRICA'S FERROUS METALS PERFORMANCE DURING THE FOURTH QUARTER OF 2023.

South Africa's total ferrous production increased by 8.3 percent compared with Q4 2023, supported by a 17.5 percent rise in iron ore output, while manganese and chrome sector's production dropped by 8.2 percent and 3.2 percent, respectively (Figure 13 and Table 8). The total ferrous production averaged at 25 971 kilo tons (kt) in the first quarter of 2024 (Q1 2024) with iron ore sector contributing 65 percent to total production, while chrome and manganese ore sectors contributed 19.1 percent and 15.7 percent, respectively. Y-o-y, total ferrous production grew by 12.5 percent, with growth notable from iron ore sector and chrome sectors, except for manganese ore production. Total ferrous sales revenue averaged at R 50.1 billion in Q1 2024, dropping by 9.2 percent and 1.3 percent, q-o-q and y-o-y, respectively, due to lower sales and unit prices in other sectors, despite a weaker rand-to-dollar exchange rate, which was unable to offset the loss in sales. The drop in sales is notable across all sectors q-o-q, while y-o-y a drop

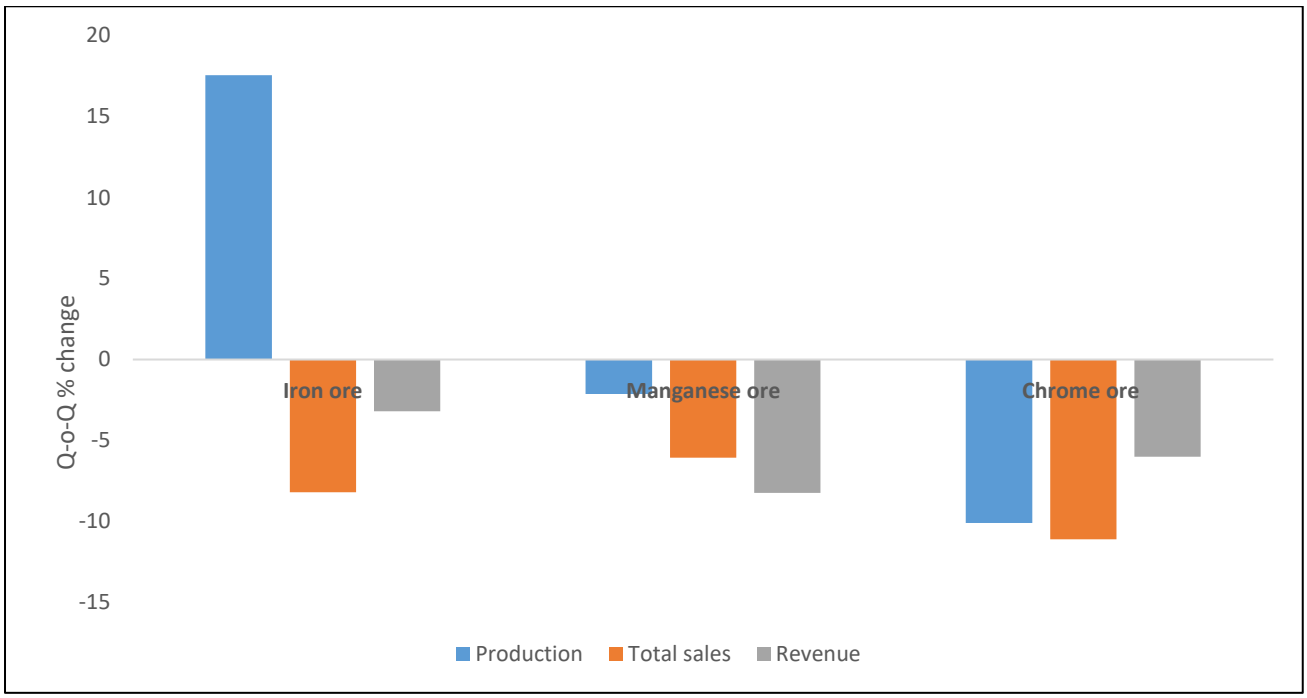
in sales is only notable from the iron ore sector, while the chrome and manganese sectors recorded an increase.

TABLE 8: FERROUS MINERALS PRODUCTION AND SALES, Q1 2024

PERIOD	PRODUCTION	LOCAL SALES		EXPORT SALES		TOTAL SALES	
	Quantity(kt)	Quantity(kt)	Value (R' bil)	Quantity(kt)	Value (R' bil)	Quantity(kt)	Value (R' bil)
Q12023	23 079	5 505	8 189 121	20 313	42 624 459	25 818	50 813 580
Q42023	23 980	5 878	9 423 806	20 880	45 775 287	26 758	55 199 094
Q12024	25 971	6 048	9 068 932	19 607	41 076 292	25 656	50 145 224
Q-O-Q	*8.30*	*2.89*	*-3.77*	*-6.10*	*-10.27*	*-4.12*	*-9.16*
Y-O-Y	*12.53*	*9.86*	*10.74*	*-3.48*	*-3.63*	*-0.63*	*-1.32*

Source: DMRE, Mineral Economics and Statistics, Q12023, Q42023 and Q12024

FIGURE 13: FERROUS MINERALS PRODUCTION AND SALES QUARTERLY % CHANGES.



Source: DMRE, Mineral Economics and Statistics.

Total iron ore production averaged at 16 893 kt in Q1 2024, growing by 17.6 percent and 18.3 percent, q-o-q and y-o-y, respectively, compared with the previous quarter (Figure 13). The growth was largely due to a rise in production from most of the iron ore producers, with production at Sishen and Kolomela mines rising by 10.10 percent and 25 percent, respectively. The double digit rise in production q-o-q was supported on the back of improved demand, coupled with improved rail performance, indicating effective measures by Transnet to curb cable theft.

Iron ore revenue averaged at R25.7 billion in Q1 2024, declining on both q-o-q and y-o-y, by 10.1 percent and 0.4 percent, respectively, affected by dropped export sales mass and low unit price, despite a weaker ZAR/USD$ exchange rate. Export sales mass recorded 4 percent and 5.4 percent drop, q-o-q and y-o-y respectively, largely contributed by planned decline in output from mines such as Sishen to align with third party logistical constrains. Domestic sales mass grew by 16 percent contrary to the drop in its corresponding pig iron production q-o-q, indicating signs of a distressed sectoral technical performance, despite improved load shedding and reduction.

Manganese ore production averaged at 4 101 kt in Q1 2024, recording 8.2 percent and 7 percent drop, q-o-q and y-o-y, respectively, due to low levels in production across most producers, as producers opted to reduce output due to weakened market conditions, coupled with oversupplied port stocks. Production at Kalagadi and Tshipi dropped by 13.5 percent and 26 percent, while that at Mokala dropped by 31 percent in Q1 2024. The corresponding manganese ore revenue averaged at R9.8 billion in Q1 2024, dropping by 11.1 percent and 18.9 percent, q-o-q and y-o-y, respectively, largely affected by a drop in export sales mass by 12.7 percent, despite a weaker ZAR/US$ exchange rate, and a marginal improvement in its corresponding unit prices. Export mass dropped due to third party logistical constraints, worsened by weather conditions which affected ship loading. Despite a 41.6 percent increase in domestic sales mass, its corresponding alloys production dropped by 31 percent, sighting continuous challenges faced by the ferroalloy sector, despite improved electricity supply, during the period under review.

Chrome ore production reached 4 976 kt in Q1 2024, a 3.2 percent drop compared with the previous quarter. The corresponding revenue averaged at R 14.5 billion in Q1 2024, dropping by 6.0 percent q-o-q, due to an 8.2 percent drop in total sales mass, this is despite a weaker ZAR/US$ exchange rate and marginal increase in unit prices. Y-o-y, chrome production and total sales mass grew by 13.2 percent and 3.3 percent, respectively. Revenue recorded a 13.6 percent increase y-o-y, owing to double-digit increase in sales mass, higher unit prices, as well as a weaker rand to dollar exchange rate. The growth in sales was supported by a 22 percent increase in export sales mass. Revenue recorded 13.6 percent increase y-o-y, owing to double-digit increase in sales mass, higher unit prices, as well as a weaker rand to dollar exchange rate.

Total ferrous employment averaged at 58 557 employees in Q1 2024, contributing 12.3 percent to total mining labour force in South Africa, (Table 9). The chrome ore sector was the largest contributor to ferrous labour force, at 41.66 percent, followed by the iron and manganese sectors at 38.7 percent and 19.6 percent, respectively. Ferrous employment recorded a 0.5 percent drop q-o-q, with a notable decline seen from the iron sector by 5.38 percent, as mines in the sectors concluded maintenance of technical projects, while employment in the chrome and manganese sector rose by 3.4 percent and 1.8 percent respectively, on the back new employment recorded at one of the major producers and from new mines. Y-o-y, ferrous employment saw a 4.9 percent growth, cushioned by a 19.4 percent rise from the chrome ore sector employment, despite a 4.4 percent and 1.3 percent drop in the iron and manganese sectors labour force.

TABLE 9: FERROUS EMPLOYMENT AND REMUNERATION, Q1 2024

PERIOD	EMPLOYEES	REMUNERATION Rands	REMUNERATION/EMPLOYEE Rands
Q1 2024	58 557	5 774 552 048	301 862
Q4 2023	58 837	5 919 878 719	308 531
Q1 2023	55 791	5 204 399 630	285 056
Q-o-Q % change	-0.5	-2.5	-2.1
Y-o-Y% change	4.9	10.9	5.9

Source: DMRE, Mineral Economics and Statistics

Total ferrous remuneration averaged at R5.77 billion in Q1 2024, contributing 11.99 percent to total mining remuneration in South Africa. Remuneration dropped by 2.5 percent, q-o-q, as the sector paid fewer bonuses, coupled with a drop in both established and contractor earnings during this period. Y-o-y, remuneration increased by 10.9 percent, supported by reverence termination redundancy (STR) and bonus payments across the ferrous sector, coupled with a rise in both established and contractor earnings during this period (Table 9).

Outlook

World Steel Association (WSA) estimates a 1.7 percent growth in global steel demand in 2024, compared with a 2.3 percent rise in 2023. Steel demand in China is expected to remain around 2023 levels in 2024, as real estate investments continue to decline, but the corresponding steel demand loss will be offset by

growth in steel demand coming from infrastructure investments and manufacturing sectors. India has emerged as the strongest driver of steel demand growth since 2021 and this indicates that Indian steel demand will continue to charge ahead with 8 percent growth in its steel demand over 2024. The EU, and the UK, remains the region currently experiencing the biggest challenges, the due to geopolitical shifts and uncertainty, high inflation, monetary tightening and partial withdrawal of fiscal support, as well as still high energy and commodity prices, facing the region and its steel-using sectors.

South Africa's ferrous production is expected to increase during the second quarter of 2024, due to reduced power outages, coupled with improved operational and rail and port efficiencies. The manganese sector will be affected by weakened market conditions coupled with high port stocks, thus affecting output. The impact will be despite high demand mainly from the electric vehicle sector. Iron ore domestic output might be affected by some producers planning a slowdown in production to align with third party logistics. However, global high iron ore prices are expected to continue through the second quarter of 2024, resulting in production ramp ups, while chrome production is expected to recover during the same period. The ferroalloy sector is expected to recover in the second quarter of 2024. This will be on the back of fewer to no load shedding and load reduction, resulting in a rise in the level of consumption for local sales quantities, while improved rail and port performance, coupled with the use of road transportation will boost export sales volumes.

References

1. *DMRE: Mineral Economics and Statistics,2023 ,2024 data*
2. *Kumba production and sales report for Q1 2024 ended 23 April 2024*
3. *www.mining.com*
4. *www.worldsteel.org*
5. *www.valorinternational.globo.com :"Iron ore prices rises almost 20 %, and is expected to go up"*
6. *www.mining-technology.com*

Rudzani Ravhugoni & Yanathi Tawa

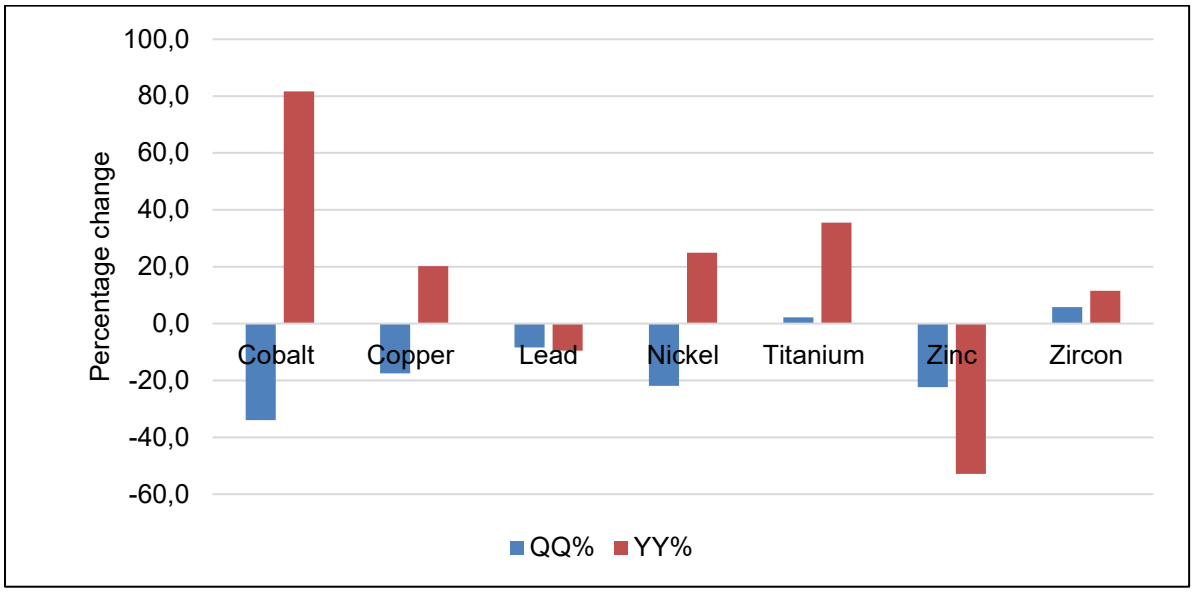
9. SOUTH AFRICA'S NON-FERROUS METALS AND MINERALS SECTOR'S PERFORMANCE DURING THE FIRST QUARTER OF 2022

Production

The production of South Africa's non-ferrous metals increased marginally by 0.6 percent to 732 kt in Q1: 2024 and 23.8 percent y-o-y, due to improved output from heavy mineral sands (zircon + 5.8 percent and titanium + 2.2 percent), as Richards Bay Minerals (RBM) improved output. The increase from heavy mineral sands offset the losses in cobalt, which registered the largest decrease at 33.9 percent followed by zinc and nickel at 22.3 and 21.9 percent, respectively (Figure 14 and Table 10).

On an annual basis, higher production increase from cobalt (81.7 %) followed by titanium (35.5 %), nickel (24.9 %), and copper (20.2 %), was more than enough to offset declines from zinc and lead production that decreased by 52.9 and 9.5 percent, respectively. This was due to lower ore grades from the Black Mountain Complex.

FIGURE 14: PRODUCTION OF NON-FERROUS METALS AND MINERALS, Q1 2024



Source: DMRE, Directorate Mineral Economics and Statistics

TABLE 10: PRODUCTION OF NON-FERROUS METALS AND MINERALS, Q1 2024

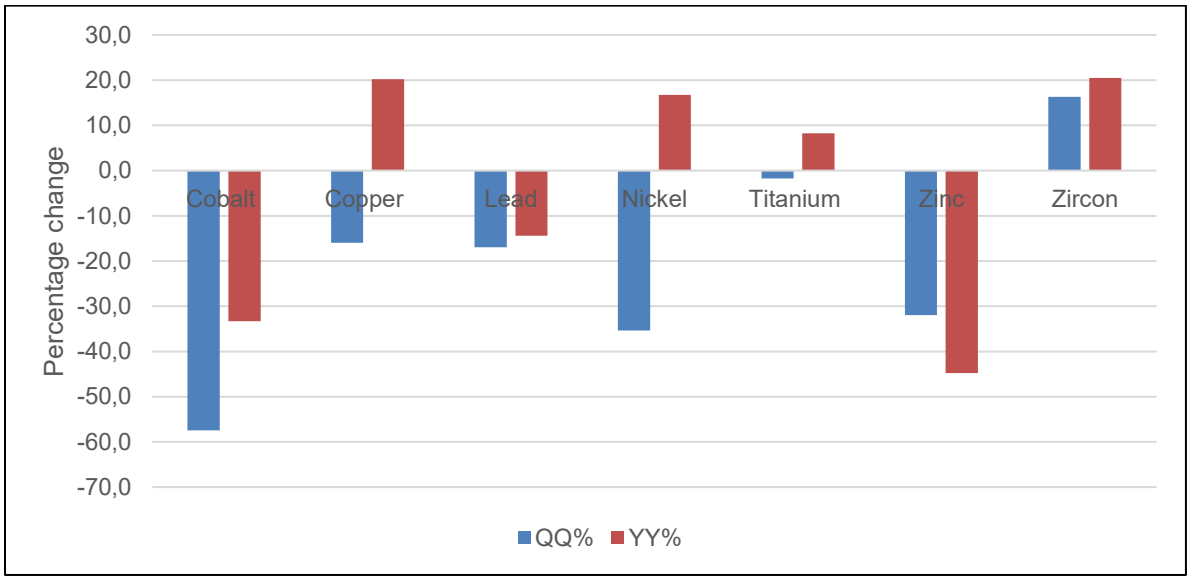
Commodity (t)	Q1 2024	Q4 2023	Q1 2023	% Q-o-Q	% Y-o-Y
Cobalt	109	165	60	-33,9	81,7
Copper	11 566	14 030	9 622	-17,6	20,2
Lead	7 643	8 344	8 447	-8,4	-9,5
Lithium	0	0	0	0	0
Nickel	6 808	8 720	5 451	-21,9	24,9
Rare Earth Minerals	0	0	0	0	0
Titanium	606 522	593 690	447 522	2,2	35,5
Zinc	25 479	32 812	54 086	-22,3	-52,9
Zircon	73 646	69 634	66 050	5,8	11,5
Total	**731 773**	**727 395**	**591 238**	**0,6**	**23,8**

Source: DMRE, Directorate Mineral Economics and Statistics

Total Sales

Non-ferrous minerals volume sales dropped by 4.4 percent to 606 kt from 634 kt q-o-q, due to lower demand from major consuming markets, as well as reduced production for most of these minerals in the first quarter of 2024. Lower sales volumes came from cobalt that declined by 57.4 percent resulting from the dwindling output from PGMs mines. Further declines in sales volumes were recorded in nickel at 35.4 percent followed by zinc (-32 %), lead (-16.9 %) and copper (-16 %). However, y-o-y, sales improved by 1.3 percent in Q1 2024 compared with the same quarter the previous year, due to higher sales from zircon at 20.5 percent followed by copper and nickel at 20.2 and 16.7 percent, respectively (Figure 15 and Table 11).

FIGURE 15: TOTAL SALES OF NON-FERROUS METALS AND MINERALS, Q1 2024



Source: DMRE, Directorate Mineral Economics and Statistics

TABLE 11: TOTAL SALES OF NON-FERROUS METALS AND MINERALS, Q1 2024

Commodity (t)	Q1 2024	Q4 2023	Q1 2023	Q-o-Q%	Y-o-Y%
Cobalt	20	47	30	-57,4	-33,3
Copper	10 548	12 555	8 776	-16,0	20,2
Lead	7 477	9 000	8 734	-16,9	-14,4
Lithium	0	0	0	0	0
Nickel	6 309	9 762	5 405	-35,4	16,7
Rare Earth	0	0	0	0	0
Titanium	449 495	457 380	415 164	-1,7	8,3
Zinc	51 370	75 529	93 066	-32,0	-44,8
Zircon	80 717	69 401	66 979	16,3	20,5
Total	**605 936**	**633 674**	**598 154**	**-4,4**	**1,3**

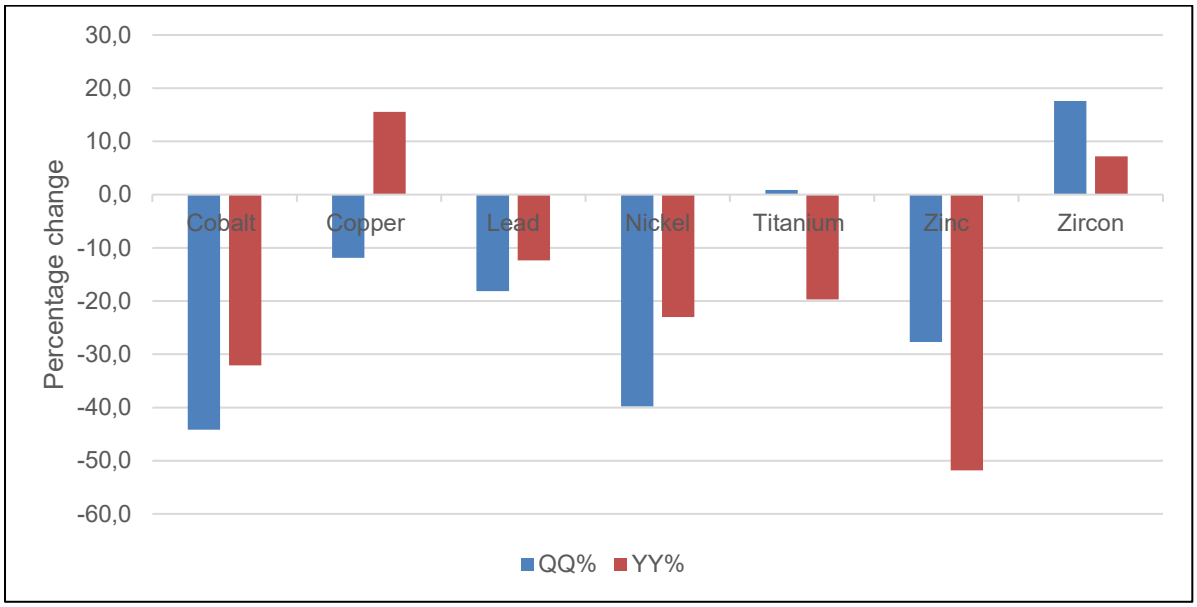
Source: DMRE, Directorate Mineral Economics and Statistics

Total Revenue

Revenues generated from sales for non-ferrous minerals in Q1 2024, fell by 15.1 percent and 16 percent y-o-y to R8.3 billion (Figure 16, Table 12). Lower revenues for this quarter were driven by lower sales volumes and weakening commodity prices, with cobalt accounting for the largest decline at 44.2 percent. While titanium was the only one recording a 0.9 percent improvement due to better performance of its prices.

On an annual basis, lower revenues from zinc (-51.8 %) followed by cobalt (-32.1 %), nickel (-23 %) and titanium (-19.7 %), were more than enough to offset higher revenues from copper (15.6%) and zircon (7.2%).

FIGURE 16: TOTAL REVENUE OF NON-FERROUS METALS AND MINERALS, Q1 2024



Source: DMRE, Directorate Mineral Economics and Statistics

TABLE 12: TOTAL REVENUE OF NON-FERROUS METALS AND MINERALS, Q1 2024

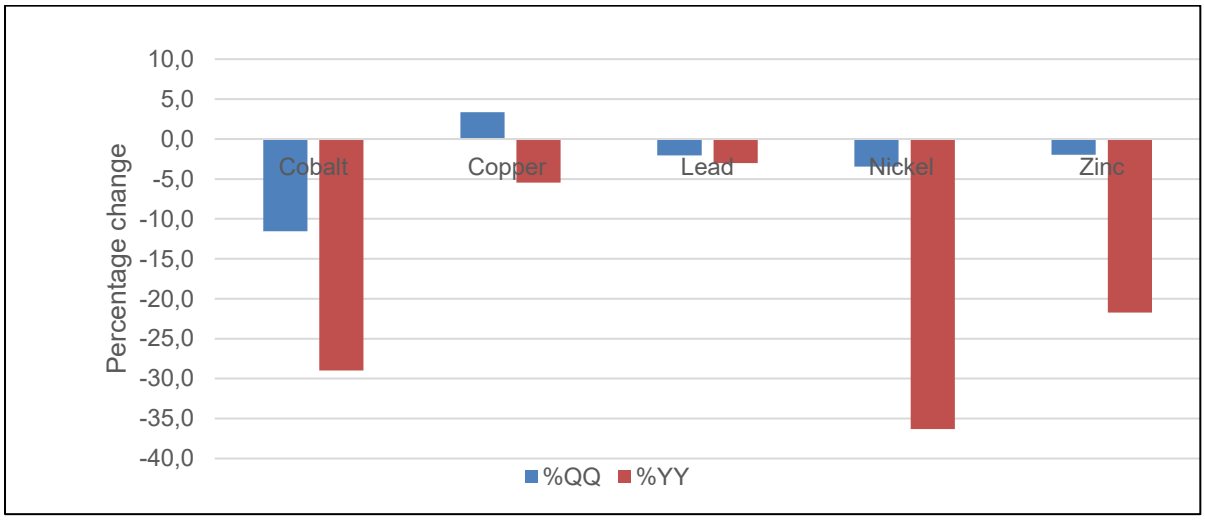
Commodity (RM)	Q1 2024	Q4 2023	Q1 2023	Q-o-Q%	Y-o-Y%
Cobalt	10 460 396	18 741 957	15 407 583	-44,2	-32,1
Copper	1 450 639 529	1 645 764 535	1 255 092 239	-11,9	15,6
Lead	272 646 617	332 997 502	311 050 537	-18,1	-12,3
Lithium	0	0	0	0	0
Nickel	1 867 453 580	3 101 351 249	2 425 465 747	-39,8	-23,0
Rare Earth	0	0	0	0	0
Titanium	1 019 199 124	1 010 091 246	1 268 920 837	0,9	-19,7
Zinc	1 033 243 870	1 428 524 316	2 144 136 502	-27,7	-51,8
Zircon	2 668 233 135	2 268 730 380	2 489 285 844	17,6	7,2
Total	**8 321 876 251**	**9 806 201 185**	**9 909 359 289**	**-15,1**	**-16,0**

Source: DMRE, Directorate Mineral Economics and Statistics

Prices

London Metal Exchange (LME) settlement prices for major non-ferrous metal continued to diminish across the board in Q1 2024, driven by China's sluggish construction sector, the largest consumer of the industrial metals. Nonetheless, copper at 3.4 percent was the better performing metal in Q1 (Figure 17 and Table 13). On an annual basis, these non-ferrous metal prices declined when compared with the same period in 2023. These lower prices were driven by lack of appetite from major consumers in EVs as well as construction sector, particularly from the China's market.

FIGURE 17: CHANGES IN NON-FERROUS METALS AND MINERALS PRICES, Q1 2024



Source: London Metal Exchange, January 2024

TABLE 13: AVERAGE COMMODITY PRICES, Q1 2024

Commodity ($/t)	Q1 2024	Q4 2023	Q1 2023	%Q-o-Q	%Y-o-Y
Cobalt	28 422	32 125	40 026	-11,5	-29,0
Copper	8 444	8 169	8 930	3,4	-5,4
Lead	2 076	2 119	2 141	-2,0	-3,0
Nickel	16 611	17 208	26 079	-3,5	-36,3
Zinc	2 449	2 498	3 130	-2,0	-21,7

Source: London Metal Exchange

Employment

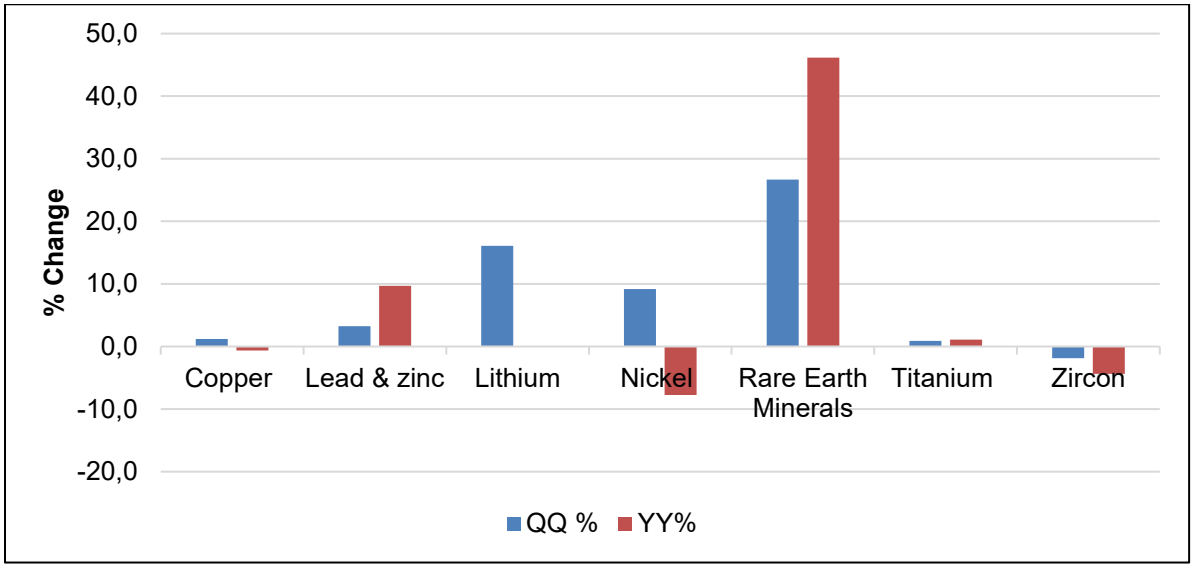
In Q1 2024, non-ferrous employment increased by 1.7 percent to 17 055 employees from 16 776 employees in the Q4 2023 (Figure 18 and Table 14), due to improved number of employees in the non-ferrous mines except zircon mines, where employment declined by 1.9 percent.

TABLE 14: EMPLOYMENT OF NON-FERROUS, Q1 2024

Commodity	Q1 2024	Q4 2023	Q1 2023	Q-o-Q %	Y-o-Y%
Copper	7 663	7 572	7 712	1,2	-0,6
Lead & zinc	3 420	3 313	3 118	3,2	9,7
Lithium	168	145	0	16,1	0
Nickel	159	145	172	9,2	-7,8
Rare Earth	6	5	4	26,7	46,2
Titanium	5 339	5 290	5 281	0,9	1,1
Zircon	300	305	313	-1,9	-4,4
Total	**17 055**	**16 776**	**16 601**	**1,7**	**2,7**

Source: DMRE, Mineral Economics and Statistics

FIGURE 18: EMPLOYMENT IN THE NON-FERROUS, Q1 2024



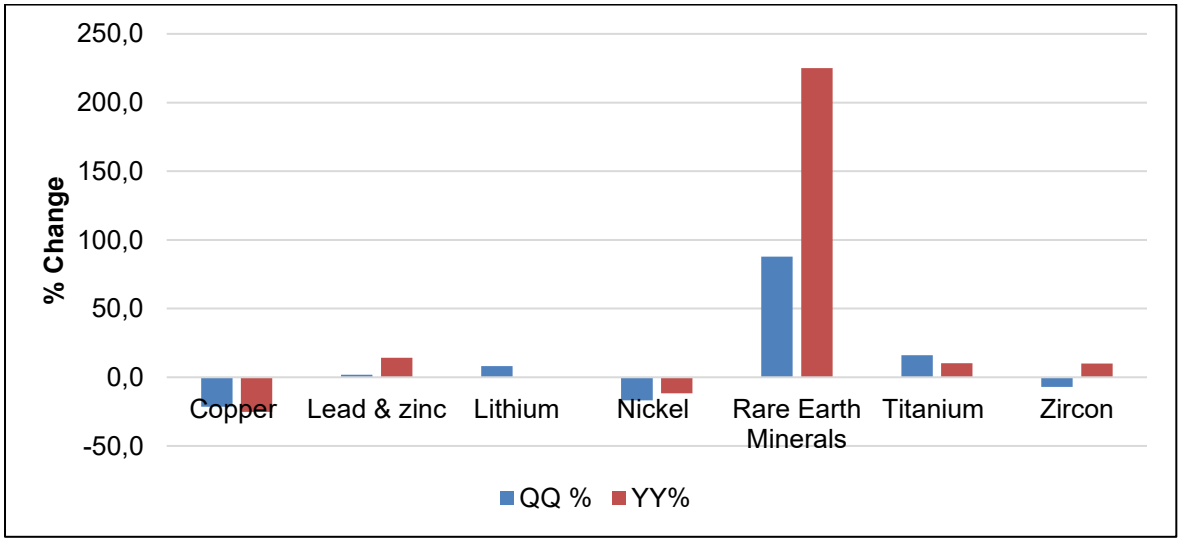
Source: DMRE, Directorate Mineral Economics and Statistics

On an annual basis, non-ferrous employment increased by 2.7 percent from 16 601 employees that were recorded in the same period in 20223. However, employment from nickel mines declined by 7.8 percent followed by zircon and copper mines at 4.4 percent and 0.6 percent, respectively. The addition of employees from lithium and rare earths mines also contributed positively to the overall employment figures.

Earnings

Total earnings for non-ferrous minerals decreased by 9.8 percent to R2.1 billion in the Q1 2024 (Figure 19 and Table 15), due to the payment of bonuses at Nkomati and Palabora Copper mines in Q4 2023. As a result, earnings from copper mines reduced by 21.4 percent, while earnings from nickel also fell by 16.7 percent. Y-o-y, non-ferrous minerals earnings dropped by 11.6 percent from R2.4 in Q1 of 2023 (Figure 19 and Table 15).

FIGURE 19: TOTAL EARNINGS OF NON-FERROUS, Q1 2024



Source: DMRE, Directorate Mineral Economics and Statistics

TABLE 15: TOTAL EARNINGS OF NON-FERROUS, Q1 2024

Commodity	Q1 2024	Q4 2023	Q1 2023	Q-o-Q %	Y-o-Y%
Copper	1 163 540 363	1 479 680 647	1 554 312 166	-21,4	-25,1
Lead & zinc	320 668 728	315 110 410	281 015 679	1,8	14,1
Lithium	16 476 163	13 958 936	0	18,0	0
Nickel	12 687 442	15 236 246	14 346 807	-16,7	-11,6
Rare Earth	1 394 330	742 480	428 826	87,8	225,2
Titanium	581 897 052	501 350 799	528 407 579	16,1	10,1
Zircon	32 608 967	35 109 562	29 653 347	-7,1	10,0
Total	**2 129 273 045**	**2 361 189 080**	**2 408 164 404**	**-9,8**	**-11,6**

Source: DMRE, Mineral Economics and Statistics

Outlook

Countries production of non-ferrous metals is expected to increase slightly as the lithium mines come on stream. Additionally, global demand for battery minerals and the transition to green energy is expected to continue to drive supply for battery minerals including cobalt, nickel, lithium, rare earths, and copper. However, the prices of these minerals are expected to remain constrained in the short term as the market is experiencing a slump, particularly in the EV battery market. Employment in the sector is expected to rise as more workforces will be required when SA lithium and Namli Exploration & Mining ramp up their production of lithium.

Sources*:*

1. *DMRE, Directorate Mineral Economics and Statistics*
2. *London Metal Exchange. Average Monthly Prices. https://www.lme.com/Metals/Non-ferrous/Monthly-averages*

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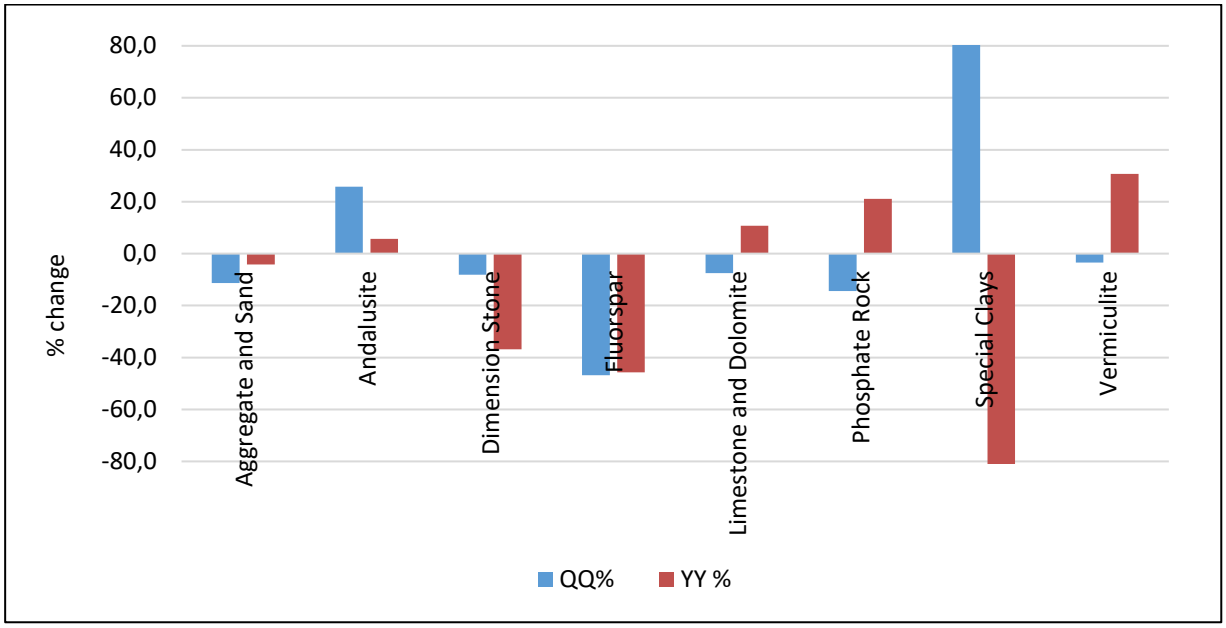
10. SOUTH AFRICA'S INDUSTRIAL MINERALS SECTOR'S PERFORMANCE DURING THE FIRST QUARTER OF 2023.

Production

Production of industrial minerals in the first quarter of 2024 decreased by 10.4 percent q-o-q to 19.96 Mt because of an unstable global economy and production delays (Figure 20 and Table 16). Fluorspar production declines were owing to producers experiencing an oversupply of the material in the market during the first month of the first quarter of 2024. The decrease in phosphate production is attributed to low demand for fertilizers resulting from shifting consumer preferences and fluctuations in raw material costs. Inversely, the year-on-year production decreased by 11.1 percent on the back of weaker recovery, as compared to the same period the previous year.

FIGURE 20: PRODUCTION OF INDUSTRIAL MINERALS, Q1 2024



Source: DMRE, Directorate Mineral Economics and Statistics

Major commodities contributing to the q-o-q decreases were the declines from fluorspar, phosphate rock, aggregate and sand, limestone and dolomite, dimension stone at 46.8, 14.4, 11.3, 7.5 and 8.2 percent respectively. Total production y-o-y declined, resulting from lower production from aggregate and sand, dimension stone, fluorspar, and special clays sectors.

TABLE 16: PRODUCTION OF INDUSTRIAL MINERALS, Q1 2024

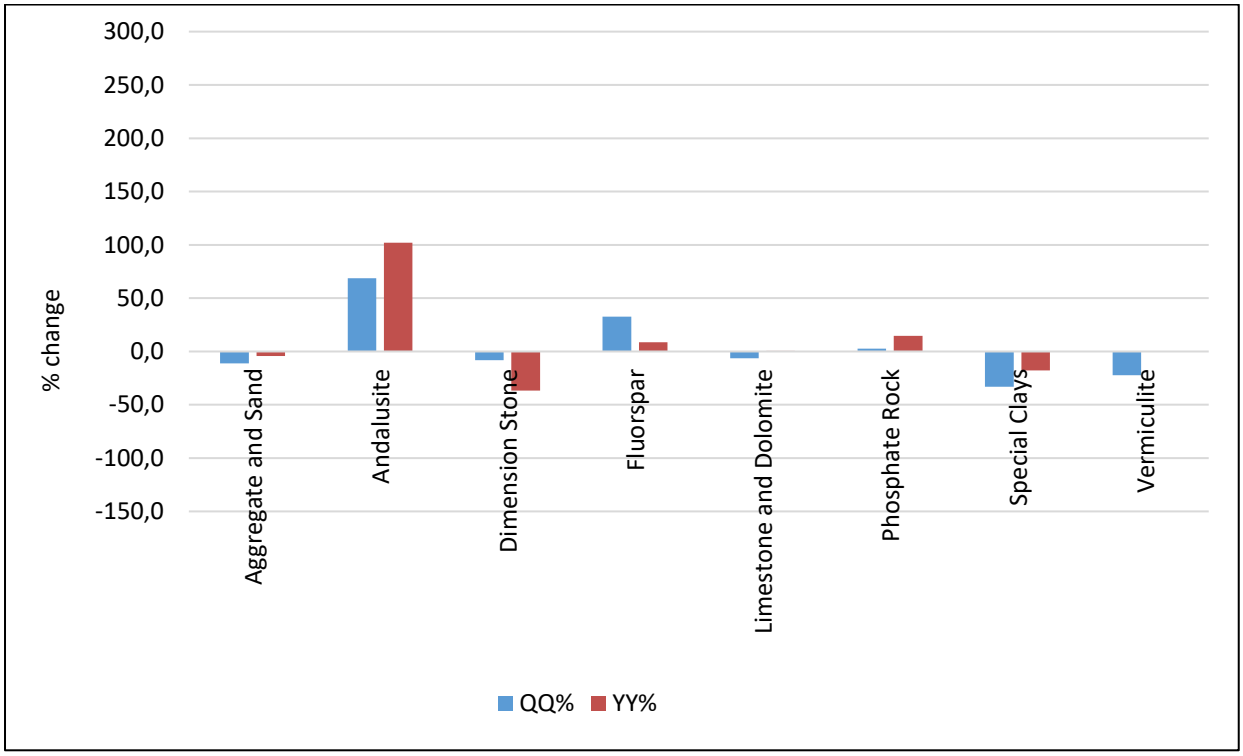
Commodity (kt)	Q1 (2024)	Q4 (2023)	Q1 (2023)	Q-o-Q%	Y-o-Y%
Aggregate and sand	12,041	13,570	12,572	-11.3	-4.2
Andalusite	31	25	30	25.8	5.6
Dimension stone	55	60	87	-8.2	-36.8
Fluorspar	54	102	100	-46.8	-45.7
Limestone and dolomite	5,055	5,463	4,565	-7.5	10.7
Phosphate Rock	487	569	402	-14.4	21.1
Special clays	273	95	2,313	186.1	-88.2
Vermiculite	44	46	34	-3.4	30.7
Other Industrial Minerals	1,918	2,357	2,341	-18.6	-18.1
Total	**19,959**	**22,287**	**22,444**	**-10.4**	**-11.1**

Source: DMRE, Directorate Mineral Economics and Statistics

Total Sales

Total sales volume of industrial mineral decreased by 10.8 percent q-o-q and decreased by 6.6 percent y-o-y to 18.71 Mt (Figure 21 and Table 17). The total sales decline was due to higher construction costs including a rapid rise in interest rates, lack of demand for granite and slate; reduced capacity for consumer demand emerging from limestone as well as quicklime for chemical uses.

FIGURE 21: TOTAL SALES MASS OF INDUSTRIAL MINERALS, Q1 2024



Source: DMRE, Directorate Mineral Economics and Statistics

TABLE 17: TOTAL SALES MASS OF INDUSTRIAL MINERALS, Q1 2024

Commodity (kt)	Q1 (2024)	Q4 (2023)	Q1 (2023)	Q-o-Q%	Y-o-Y%
Aggregate and sand	12,041	13,570	12,572	-11.3	-4.2
Andalusite	55	33	27	68.8	102.0
Dimension stone	55	60	87	-8.2	-36.8
Fluorspar	98	74	90	32.6	8.7
Limestone and dolomite	4,480	4,781	4,461	-6.3	0.4
Phosphate Rock	531	518	463	2.6	14.7
Special clays	106	159	129	-33.2	-17.9
Vermiculite	31	40	39	-22.2	-21.0
Other Industrial Minerals	1,309	1,739	2,164	-24.7	-39.5
Total	**18,706**	**20,972**	**20,032**	**-10.8**	**-6.6**

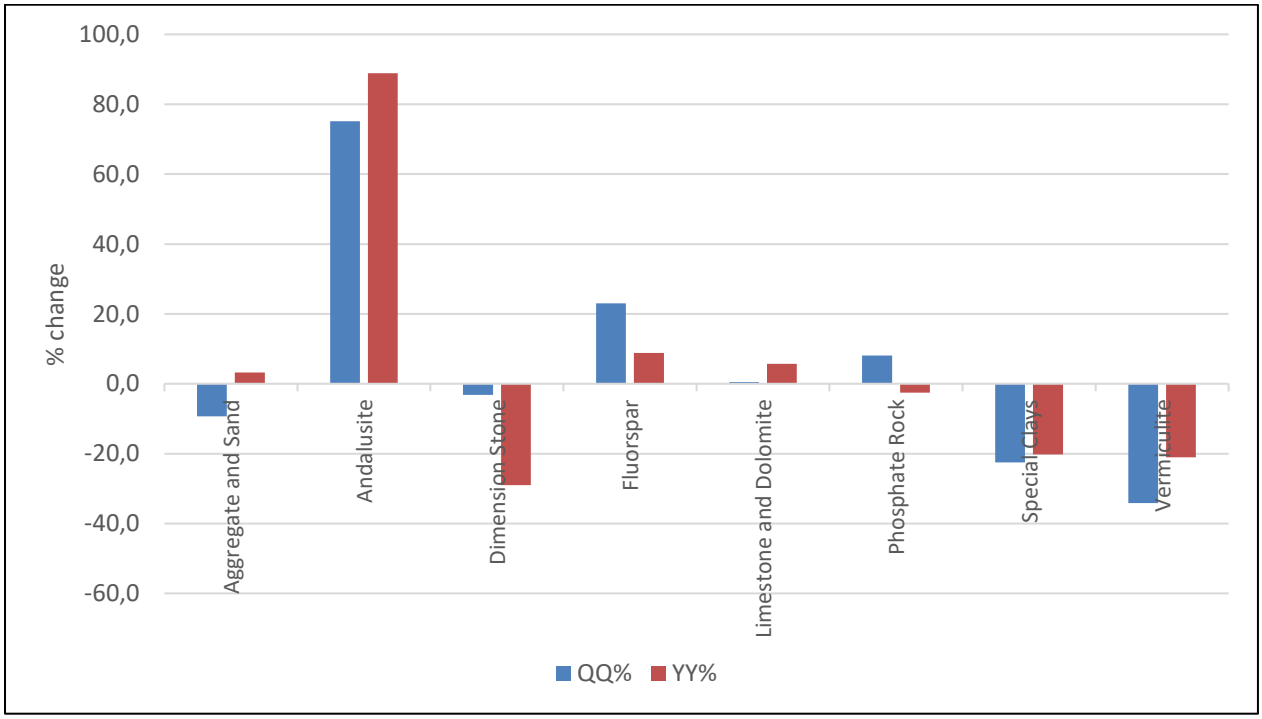
Source: DMRE, Directorate Mineral Economics and Statistics

Total Revenue

Total sales value increased slightly by 0.1 percent q-o-q to R6.3 billion, as industrial minerals demand improved and comparatively, the year-on-year revenue rose by 2.6 percent on the back of higher volumes traded during the period under review (Figure 22 and Table 18). Andalusite sentiments were increased after contract negotiations. That, led to upswings attributed to increased activity and trade during the first quarter compared to fourth quarter which had early festive closures. The exports demand capacity of granite blocks also increased. Fluorspar local market more than doubled during first quarter of 2024, due to increased appetite for metspar in the local market, which follows a sluggish fourth quarter. Data for

some mines which had projections were replaced with actual figures from February 2023 to December 2023.

FIGURE 22: TOTAL SALES REVENUE OF INDUSTRIAL MINERALS, Q1 2024



Source: DMRE, Directorate Mineral Economics and Statistics

TABLE 18: TOTAL SALES REVENUE OF INDUSTRIAL MINERALS, Q1 2024.

Commodity (R`)	Q1 (2024)	Q4 (2023)	Q1 (2023)	Q-o-Q%	Y-o-Y%
Aggregate and sand	1,674,633,828	1,847,237,616	1,621,964,844	-9.3	3.2
Andalusite	351,085,132	200,456,478	185,889,944	75.1	88.9
Dimension stone	120,873,212	124,907,221	170,251,475	-3.2	-29.0
Fluorspar	794,403,921	645,554,446	729,998,856	23.1	8.8
Limestone and dolomite	1,031,656,856	1,026,455,160	976,284,289	0.5	5.7
Phosphate Rock	1,657,037,511	1,532,550,424	1,700,546,812	8.1	-2.6
Special clays	28,229,233	36,439,535	35,369,488	-22.5	-20.2
Vermiculite	143,179,219	217,346,592	181,408,211	-34.1	-21.1
Other Industrial Minerals	513,805,059	675,057,645	552,114,232	-23.9	-6.9
Total	**6,314,903,971**	**6,306,005,117**	**6,153,828,151**	**0.1**	**2.6**

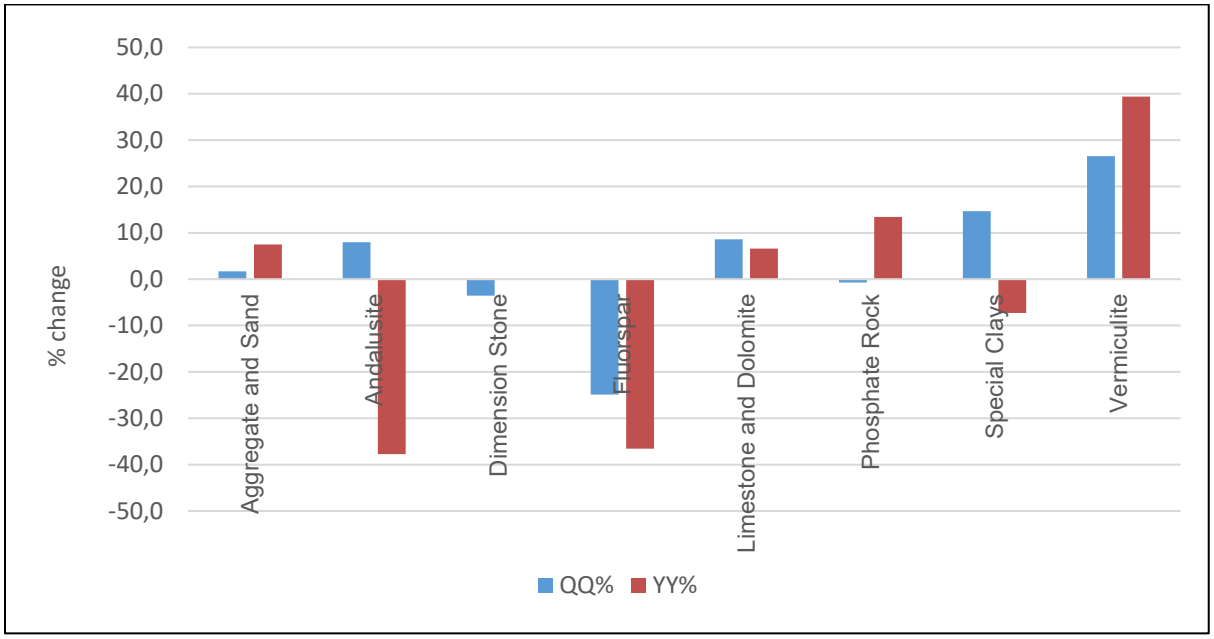
Source: DMRE, Directorate Mineral Economics and Statistics

Prices

The average local unit values for vermiculite increased by 26.5 percent q-o-q and by 39.4 percent y-o-y to R5 047t, owing to inflation price increases (Figure 23 and Table 19). Average local unit value of special clays increased by 14.6 percent q-o-q, due to increased market price q-o-q and decreased by 7.3 percent y-o-y to R264/t. Average local unit value for limestone and dolomite increased by 8.6 percent q-o-q and by 6.6 percent y-o-y to R231/t owing to increased commodity prices in 2024. Andalusite increased by 8

percent q-o-q and decreased by 37.8 percent y-o-y to R3 114/t, owing to higher sales volumes. The average local unit values of aggregate and sand increased by 1.7 percent q-o-q and by 7.5 percent y-o-y to R136/t, as sales prices increased in 2024. Average local unit value of fluorspar decreased by 24.9 percent q-o-q and by 36.6 percent y-o-y to R2 761/t, attributed to lower market prices. Dimension stone decreased by 3.5 percent q-o-q and remained constant y-o-y to R1 629/t, while phosphate rock's decreased by 0.7 percent q-o-q and increased by 13.4 percent y-o-y to R2 442/t.

FIGURE 23: AVERAGE LOCAL UNIT VALUE (R/t) OF SELECTED INDUSTRIAL MINERALS COMMODITIES



Source: DMRE, Directorate Mineral Economics and Statistics

TABLE 19: AVERAGE LOCAL UNIT VALUE (R/t) OF SELECTED INDUSTRIAL MINERALS COMMODITIES.

Commodity (R`)	Q1 (2024)	Q4 (2023)	Q1 (2023)	Q-o-Q%	Y-o-Y%
Aggregate and sand	139	136	129	1.7	7.5
Andalusite	3,114	2,883	5,003	8.0	-37.8
Dimension stone	1,629	1,688	1,629	-3.5	0.0
Fluorspar	2,761	3,678	4,352	-24.9	-36.6
Limestone and dolomite	231	213	217	8.6	6.6
Phosphate Rock	2,442	2,460	2,152	-0.7	13.4
Special clays	264	230	284	14.6	-7.3
Vermiculite	5,047	3,989	3,620	26.5	39.4

Source: DMRE, Directorate Mineral Economics and Statistics

Employment and Earnings

Industrial minerals workforce decreased by 0.2 percent q-o-q to 18 007 employees, from 17 838 employees, attributed to decreased labour capacity for male personnel in aggregate and sand, andalusite, dimension stone, limestone, and special clays sectors. The declines have been caused by the strike during the months of February and March 2024 at Annesley. Nokeng fluorspar mine laid off some contractors. Inversely, the year-on-year employment increased by 1.1 percent, as female and contractor employment

increased as compared with the same period in the previous year. Remuneration decreased by 5.3 percent q-o-q. The downswing in remuneration coincides with the decrease in labour force and coming from strikes at andalusite mine for two months in 2024, laying off contractors and lesser severance, terminations, and retrenchment (STR) and bonuses paid at several mines in Q1 2024. The year-on-year comparison saw remuneration also increase by 5.8 percent on the back of increased gross earnings and bonuses as total number of employees increased in 2024 as compared to 2023. The employment of female personnel increased by 1 percent (q-o-q) and by 5.3 percent y-o-y. The number of contractors increased by 0.1 percent q-o-q and by 4.9 percent y-o-y coming from a low base. There were bonuses paid out at Foskor (January 2024) and Elandsfontein Phosphate Mine (January 2024) (Table 20).

TABLE 20: INDUSTRIAL MINERALS EMPLOYMENT AND EARNING DURING QUARTER 1, 2024

Period	Male	Female	Contractors	Total employment	Total earnings (R' mil)
Q1 (2024)	9,753	2,380	5,875	18,007	1,361.3
Q4 (2023)	9,815	2,357	5,868	18,039	1,437.3
Q1 (2023)	9,955	2,260	5,600	17,815	1,287.0
Q-o-Q%	**-0.6%**	**1.0%**	**0.1%**	**-0.2%**	**-5.3%**
Y-o-Y%	**-2.0%**	**5.3%**	**4.9%**	**1.1%**	**5.8%**

Source: DMRE. Directorate Mineral Economics and Statistics

Outlook

The South African construction sector is poised to make a robust start in 2024, standing out among the limited economic sectors showing promising activity. The government has prioritised infrastructure development projects, including roads, bridges, ports, and housing, to stimulate economic growth and address historical inequalities.

There is a significant growth in the refractory market mainly due to the increasing demand for steel due to infrastructure expansion and flourishing automobile and railway industries. Hence, the market for dimension stone mining is expected to increase because of the strengthening demand for stone materials in the building and construction sector brought on by rising infrastructure spending.

Fluorspar demand will see major changes in the next five years, as the use of lithium hexafluorophosphate (LiPF6) in battery production will increase from 6 percent to 13 percent of total HF demand. Overall, the stability and strength of the industry has gradually continued to improve and overall growth in industrial minerals is expected to be kept buoyed as most industrial minerals are used in construction and agricultural applications.

Mphonyana Modiselle

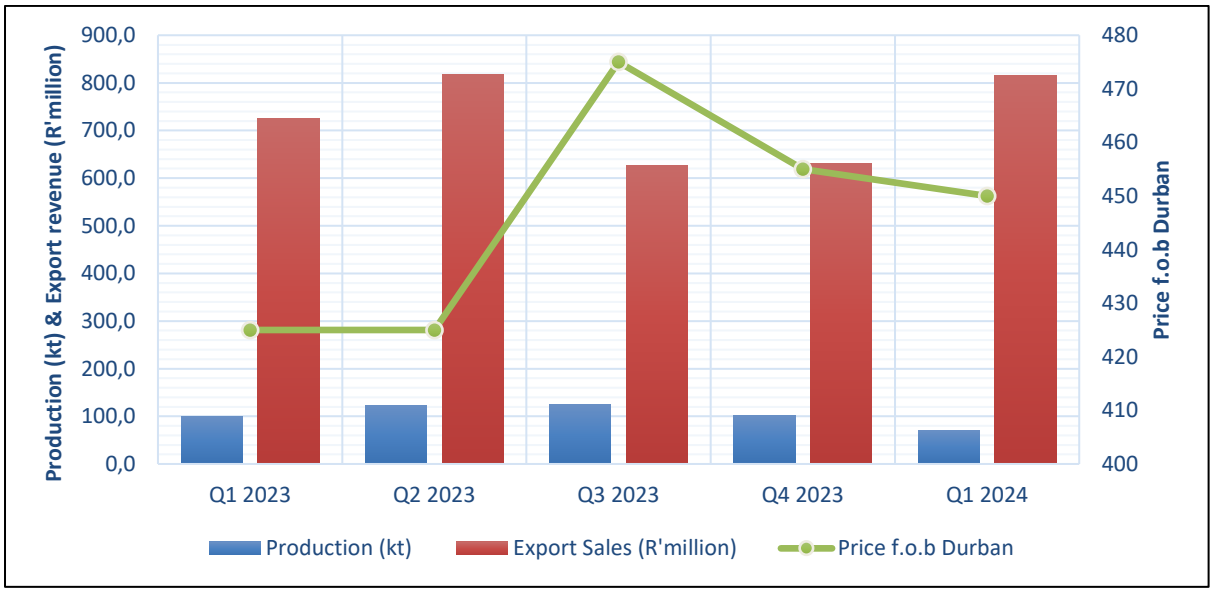
11. FLUORSPAR MARKET TAKEAWAYS, Q1 2024

Tepid demand and supply, China, battery market and renewable energy demand.

Domestic production of fluorspar and export revenue went up from the first quarter to the second quarter of 2023 by 23.7 percent and 13 percent, respectively (Figure 24). The uptick was owing to the market's tendency to stabilise during the second quarter, as Asia Pacific, Europe, and North America's climate moves from winter to higher temperatures, allowing for increased operation and the start of new year-long contracts. The price of acid-spar remained fixed for the first two quarters of 2023 estimated at $425/t fob

Durban. Continued strained power generation led to a single digit increase of about 1.5 percent in production during the third quarter of 2023 from 123 kt to 125 kt. Sluggish international demand from the downstream market was not sufficient to incite orders, which saw an export revenue decline of about 23.5 percent. The lacklustre demand in acids-par may also be attributed to the overall price hike for the material during the third quarter of 2023. The South African produced acid-spar was trading at an average of about $475/t during the third quarter, denoting an 11.8 percent increase from the second quarter price level. Supply side buoyancy was short-lived, as production declined during the fourth quarter of 2023 and first quarter of 2024 by 18.7 percent and 30.4 percent, respectively. Domestic supply of fluorspar was hampered by festive closures and shipping disruptions that saw producers with delayed shipments resulting in large stockpiles of the material. Inversely, demand slightly picked up during the fourth quarter by 0.9 percent, as the price of acid-spar declined to $455/t. A further upswing export demand of about 29 percent, largely induced by a further price decline of about 1 percent. Demand was also stimulated by China's increased appetite for imported acid-spar, due to stringent nationwide inspections.

FIGURE 24: FLUORSPAR QUARTERLY PRODUCTION, EXPORT REVENUE AND PRICE



Source: 1. DMRE, Mineral economics and statistics
2. Chem Analyst

Constrained supply may persist, exacerbated by expected tightness in supply from China. The country's Mine Safety Administration announced a nationwide safety inspection within the fluorspar mining sector, following major accidents that claimed four lives in 2023. Previous inspections had only been conducted in individual provinces, but this will be China's first nationwide safety inspection of fluorspar mining, targeted at improved safety in operations and combating illegal mining. Furthermore, with China's fluorspar reserves having been hit in recent years by over-mining, the Chinese government has opted to close small fluorspar mines and consolidate them into fewer, larger operations. Aiming to improve production efficiency and reduce environmental impact, the move was prompted by provisions in the Mineral Resources Master Plan issued by China's Ministry of Natural Resources at the end of 2022.

Limited supply from China will provide other regions, like South Africa, with an opportunity to make up for the supply shortage. The Chinese ministry further announced an import tariff reduction on fluorspar and fluorspar-related products from January 2024. This is expected to increase and galvanise fluorspar imports to make up for the anticipated shortfall. Another demand driver for the material will stem from its indispensability in battery production, which is supported by demand for Electric Vehicles (EVs). In addition to its use in refrigeration technology, fluorspar is also essential in the new energy and new materials sectors, for example in the production of lithium hexafluorophosphate, polyvinylidene fluoride (PVDF), graphite anodes and photovoltaic panels. There has been some buoyant sentiment in the Asian battery market for the use of fluorspar in battery production, with sources citing that the production of a new energy

car requires 45 kg of acid-spar. Global demand for fluorspar from the new energy sector is anticipated to exceed 5 million tons in 2030. Demand from the photovoltaic power industry is also strong, as the production process requires large quantities of hydrofluoric acid (HF), indicating that the need for fluorspar from the new energy is increasing year by year. The rapid development of the new energy and semiconductor sectors is likely to support the long-term demand for fluorspar and its price. These developments will likely lead to a bullish fluorspar market and strong demand for the material in 2024 and beyond.

Sources:

1. *DMRE, mineral economics and statistics*
2. *Chemanalyst, https://www.chemanalyst.com/Pricing-data/fluorspar, accessed 30/10/2023.*
3. *Fastmarkets, https://www.fastmarkets.com/insights/key-topics/, accessed 22/04/2024.*

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