



MINERALS COUNCIL
SOUTH AFRICA

MINTEK'S 90TH birthday celebration:

Where we come from, where are we now and where are we going

Good morning, honourable ladies and gentlemen and a special greeting and acknowledgement to

- Honourable Minister of the DMPR, Mr Gwede Mantashe,
- Deputy Minister of the DMPR, Honorabe Judith Nemadzinga-Tshabalala
- Director General of the DMPR, Mr Jacob Mbele and your team
- Dr Rebecca Maserumule, Department of Science & Innovation
- Mr Mosa Mabuza, CEO of Council for Geoscience
- Chairman of the Mintek Board, Dr Thibedi Ramontja
- Mintek CEO, Dr Molefi Motuku
- Members of staff from Mintek
- Members of the academic and research fraternity,
- Industry CEOs
- International guests:
- And all protocol observed

Thank you to Mintek and Dr Molefi for the invitation and giving the Minerals Council South Africa the opportunity to address this auspicious occasion – Mintek's 90th birthday celebration. It is indeed an honour.

For an institution such as Mintek, (formerly known as the Council of Mineral Technology) a 90th birthday celebration is a recognition of the **resilience** which has sustained it over these years. This occasion pays tribute to and recognises the countless efforts of individuals who have contributed immensely to its leadership in mineral science, processing technology and innovation at Mintek and wider networks in South Africa and globally. These individuals have contributed their talent, passion, and expertise.

Mintek celebrates this occasion a few weeks after the Minerals Council itself celebrated 135 years of existence in the mining industry. And not to forget another family member, the South African Institute of Mining and Metallurgy, who celebrated 130 years this year. So, the Minerals Council is the elder in the family of mining institutions in South Africa.

Briefly about the Minerals Council: we are the primary advocate and representative of the South African Mining industry and represent over 70 members, both senior and junior exploration and mining, who generate

more than 90% of South Africa's mineral production by value from more than ten commodities ranging from precious metals, bulk commodities and industrial minerals. Advocacy is what we do. Our purpose ***is to co-create an enabling environment for the mining industry to thrive. (A thriving mining industry is growing through regular investment in exploration and mine development, is operating safely with healthy operating conditions for its employees, creates opportunities for employment throughout the economy, collaborates with social partners to uplift the livelihoods of communities and demonstrates environmental stewardship, all for the social and economic benefit of the country).*** We are guided in our endeavour by our values of responsible citizenship, striving to earn the Trust of society, engaging with honesty and being accountable to our stakeholder, we conduct ourselves with respect towards others.

And so, the relationship between the Minerals Council and Mintek is deliberate and fundamentally solid. It continues to be a collaborative relationship aimed at advancing the mining and minerals industry in South Africa. For example: -

- Recently, and led by the DMPR, we have been working on developing the critical minerals strategy for the country. Amongst others, the analysis will help in harvesting the orchard of low-lying fruit in terms of, *firstly*, strengthening current beneficiation activities and *secondly*, identifying the practicable value chains we can focus on for beneficiation given the scramble for mother Africa's mineral endowment.
- Led by Mintek, we are collaborating on developing a "state of mining" reports for the various mining subsectors. These reports will help us understand the key constraints in the various emerging critical commodity sectors. This deeper understanding is required to develop proposals to unlock bottlenecks and create opportunities for increased investment in exploration that will lead to mine development and employment creation, thus generating tax revenue for the state.

My address to you this morning is focused on sharing my perspective on the relationship between Mintek and the Minerals Council and how I see this duo collaborating on creating a pathway for the success of the mining industry and growth of the economy. I will focus on three themes that will illustrate the industry contribution and economic impact of Mintek, starting

with **where Mintek has come from**, then stepping onto **where Mintek is now**, and finally transport you to **where Mintek may/or should be going**. These are important considerations as we take stock of the important role Mintek has played in the mining sector and should continue to play for the foreseeable future of the industry.

The mining sector in South Africa

Before I get to the material aspects of my address, I thought it important to briefly sketch out our sector for the benefit of both our international audience and the few remaining sceptics of the industry. It is a sector that has delivered enormously to the country and remains with equally enormous potential which could catalyse the economic revitalisation of South Africa.

- It is a sector that was key to the country's industrialisation. Johannesburg is known as the **city of gold** because of its rich gold mining history. The Johannesburg Stock Exchange (JSE), founded in 1887 (an institution slightly older than the Minerals Council) during the gold rush, was created to facilitate the flow of capital to mining ventures, fuelling the sector that shaped both the city and South Africa's economy.
- The foreign exchange earnings generated by minerals exports help South Africa to pay for imported capital goods and to service its external debt. Although there are many drivers of currencies, the value of the Rand is supported by foreign earnings generated by mineral exports. Exports of minerals and mineral related products account for more than 50% of total South African merchandise exports.
- Whilst the contribution to the national GDP has declined to about 6.3% of GDP (2023) from 21% in 1980, it is still at the centre of the country's catalyst for economic growth and contribution to macroeconomic stability. The sector pays the highest average remuneration per worker outside of government and utilities. In 2023 average remuneration per worker in the mining sector was R379 656 (US\$22 000). With a dependency ratio of 1:9, i.e. for each Rand a miner earns, nine more people depend on it. The mining sector plays an important role in supporting lives and livelihoods.
- I describe the mining sector as one of the **magnificent seven** attributes of South Africa. **It is not** the sunset industry that it is at times mistakenly described as. In terms of mineral endowment, South Africa is ranked in

the global top ten in 11 minerals including chrome, manganese, gold, the PGMs, vermiculite, zirconium, fluorspar, vanadium, titanium, phosphate rock, and uranium, minerals that are critical for the future. Further down the list includes copper, rare earths and iron ore. Given a conducive operating environment, such as, to name a few, reliable infrastructure in water, energy, telecommunications and logistics, favourable legislation and incentives, this sector can be the beneficiary of increased exploration leading to a diversity of mines being established with positive spinoffs for the South African economy, changing the social and economic fate of the country and the region, better than what it has achieved in the past.

Where we come from

So then, when I reflect on *the past* and acknowledging that 90 years is a long history, I will be brief. Having been established in 1934 as the Minerals Research Laboratory (MRL) of South Africa, Mintek's technology and innovation have been instrumental in shaping the structure and advancement of our mining industry; sustaining and in many instances growing mining production and mineral processing, reducing mining and processing operational costs, improving health and safety and reducing greenhouse gas emissions for the PGMs, gold, chrome and downstream smelters. The technologies and innovations found application both in South Africa and globally.

Given the history of our country, it is worth mentioning that the social and economic structure, in terms of low-skilled and cheap labour, *amongst others*, was designed to ensure the success of the mining industry, a legacy we continue to be challenged with, but are progressively overcoming. Given the opportunities presented to us today through RD&I and technology, the future bodes well for the industry and the country. I will touch on this later.

Exploration is a fundamental and high-risk form of mining research and key ingredient to the growth of the mining sector that we know today; and so is "Research, Development and Innovation" - South Africa is unnecessarily struggling in both these areas. Nonetheless, it is refreshing to note that Mintek has been pivotal in ensuring that the mining sector has remained globally competitive through pioneering innovations, such as:

1. In the PGMs commodities: -
 - Developing the flotation procedure to reduce the amount of chromite in PGM concentrates,
 - Developing a novel smelting technique using higher current densities and temperatures to process still-high chromium content in PGM concentrate, which resulted in the doubling of the country's PGM ore reserves,
 - Mintek's DC arc furnace technology became a cornerstone for PGMs and ferroalloys beneficiation.
 - These innovations improved the economic viability of these mineral horizons and increased production and worker productivity.
2. In the gold industry, the carbon-in-pulp along with the resin-in-pulp technologies boosted the recovery of gold.
3. The gold, ferrochrome, ferronickel and ilmenite smelting industries were also beneficiaries of Mintek's innovations, including an increase in cobalt recovery from slag. Combined, these initiatives contributed immensely to the economic performance and diversification of the mining sector.

Today, Mintek has demonstrated an incredible ability to adapt to a changing global context. Importantly, it has responded positively to domestic pressures and constraints affecting the mining sector, helping to identify opportunities to reduce emissions and arrest electricity costs, thus enhancing the endurance in the performance and economic contribution of the sector. Examples include:-

1. **Mintek's role in the climate change discourse and response.** With greenhouse gas emissions becoming major concerns in their impact on climate and livelihoods, Mintek was at the frontier of developing the ConRoast process to reduce sulphur emissions, benefitting nickel, copper, cobalt and PGM production.
2. **Further, Mintek's role in energy efficiency and mitigating the escalation in electricity tariffs.** Since 2008 electricity tariffs for the mining sector have increased by more than 700%, which has affected the sector's cost competitiveness, being largely price takers. The

highly energy-efficient Minfurn™ technology has mitigated the impact that high electricity tariffs have on the gold industry. Eight of the deepest gold mines in the world are found in South Africa. Reaching temperatures of up to 50°C at some of the working areas; hence, a huge amount of energy is required for refrigeration and ventilation to cool the working environment. The energy consumption of these mines is enormous, as such the Minfurn™ technology is key to limiting the cost escalation of the gold mining and processing industry.

These are just examples of the impacts that Mintek has and continues to have in the country's mining sector and beyond our borders, as its technology and innovations are used across the globe on every continent where mining takes place – viz., Australia, USA, Russia, Argentina, Brazil, China, India, Namibia, DRC, Kazakhstan, Sunada and Papua New Guinea, to name just a few of the 60 countries where Mintek has established its footprint.

The success of Mintek to date is also a highlight of its collaboration with various industry players who are at the frontier of the application of Mintek's innovations, as well as academia and other research councils.

I would not have done justice in my speech if I did not raise an issue that most RD&I institutions are faced with today – that of funding and attracting and retaining competent skills.

- ✓ Increased funding for RD&I institutions: The governments of South Korea and Israel (two leading countries in innovation and technology) contribute an average of 25% to their country's total RD&I expenditure. The South African government on the other hand contributes around 10% annually. There is clearly a need for government to increase its share, especially to institutions that are connected to the mining sector, which can serve to catalyse long term sustainable economic growth.
- ✓ Skills: Attracting and retaining highly qualified and competent skills is critical to the effective functioning and operation of research institutions such as Mintek. A skilled workforce is at the centre of RD&I institutions delivering high quality research and innovations that address the challenges and opportunities of society and industry. Mintek should continue to attract and retain these skills, which is also a function of adequate funding.

- ✓ From 1994 to 2023 R&D expenditure by the mining sector was increasing well above consumer price inflation at an annualised rate of 10.4% compared to 5% for CPI. In 1994 the sector had spent R622 million on R&D compared to over R5 billion (in nominal terms) in 2023.
- ✓ Bottomline, we cannot confidently speak of reaching the future and achieving our ambitions given such low rates of research funding and support for institutions such as Mintek.

Where to from here

Continuing on the theme of RD&I expenditure through the imperfect lens GDP as a measure of economic performance, South Africa spends approximately 0.8% of GDP on research and development. This is too low to foster long-term sustainable economic growth that can deliver increased employment opportunities and improve skills levels, unshackle structural poverty and reduce inequality for many millions of South Africans and restore the dignity of the nation. An internationally recognised benchmark to enable long-term sustainable economic growth is an average of 3% or more. A doubling of our R&DI expenditure to 1.6% and inching towards 2% of GDP should shift the dial on our economic growth, harnessing the human skills and generating a higher youth dividend for the country. The highest average recording of R&DI to GDP for South Africa was 1% from **1994 to 2008**, a period where South Africa experienced the highest real average annual economic growth of 3.7%. The mining sector's R&DI to GDP averaged an uninspiring 0.6% from 1994 to 2023, despite Mintek proving its critical role to the growth of the sector – all else constant.

What does this mean for South Africa and the mining sector? More expenditure in Research, Development & Innovation (RD&I) for a mining sector that can be the catalyst for achieving higher rates of economic growth that will elevate the level and pace of social progress. My vision is an industry that is modernising and supported by a social and economic structure of innovative and highly skilled and diverse population with the freedom of choice and movement of where to live and work. A total contrast from our past of discrimination for the benefit of the few. Such will be the lasting transformation of the mining industry and its impact on the country.

And so, as we think about the future and the role that Mintek can, will and should play, I will venture **four** broad themes: -

1. **Critical minerals and mineral beneficiation.** Mintek is already very active in the beneficiation space and is expected to play an important role in investigating the end-use applications of critical minerals, especially with a view of addressing South Africa's challenges in the energy and infrastructure space. Infrastructure development is an imperative and key enabler for the transition for South Africa. However, potential beneficiation should be well considered, such that it does not impede on current opportunities for investment in exploration and mining. Restrictions of any kind on mining exports with the view to encouraging beneficiation will be short term in the benefits, if at all. Rather consider the incentives required that will encourage relevant market opportunities for beneficiated mineral products over the medium to long term, as we put the right conditions in place for growth in this value chain of the industry.
2. **The hydrogen economy.** Mintek is actively researching the efficiency of platinum and ruthenium-based catalysts in the electrolysis process. While these catalysts are more expensive, they have proven to be more effective than their alkaline-based counterparts, highlighting their potential in advancing technologies that rely on the platinum group metals (PGMs). A cost effective and efficient PGM-based catalyst will boost refulgent beneficiation, add value to the country's raw materials, create employment, and boost the country's foreign exchange earnings via the export of high value products.
3. **Partnerships.** Together with other stakeholders, Mintek should be part of a network of centres of excellence that collaborate to enable the South African mining sector to achieve its true potential.
4. **Global cost competitiveness and carbon efficiency.** While unit labour costs in the mining sector have declined at an annualised rate of 0.9% between 1993 to 2023, labour productivity has not improved. It has in fact been declining at an average annualised rate of 0.1% in the same period. This is a key indicator of the growth potential and global competitiveness of the sector.

Conclusion

Mintek has quietly been at the centre of development and prosperity of the mining sector, and during a significant period of domestic and global economic developments. As the world embarks on technology and energy transitions, Mintek and the Minerals Council (through its members) find themselves at the cusp of significant and transformative change that is providing unprecedented opportunities (and risks). Given the capabilities of both institutions, the passion for the industry and networks of collaboration, these opportunities for research and innovation are within reach.

I look ahead into a horizon where Mintek continues to lead and partner with key stakeholders to ensure that the country's minerals drive growth and development as well as enhance social progress and prosperity for our nation.

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