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A REVIEW OF SOUTH AFRICA'S

PLATINUM SECTOR

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LIST OF ABBREVIATIONS AND ACRONYMS

2E	platinum and palladium
4E	platinum, palladium, rhodium and gold
6E	platinum, palladium, rhodium, iridium, ruthenium and gold
AMCU	Association of Mineworkers and Construction Union
Amplats	Anglo American Platinum
ARM	African Rainbow Minerals
BEE	black economic empowerment
BRPM	Bafokeng Rasimone Platinum Mine
CACSA	Competition Appeal Court of South Africa
capex	capital expenditure
ConCourt	Constitutional Court
CRM	Crocodile River Mine
DCM	Dilokong Chrome Mine
DFS	definitive feasibility study
DMRE	Department of Mineral Resources and Energy
Eastplats	Eastern Platinum
ETF	exchange-traded fund
FCEVs	fuel cell electric vehicles
FTM	Fill the Mill
GLC	Greater Lonmin Community
HySA	Hydrogen South Africa
Implats	Impala Platinum
JV	joint venture
Jogmec	Japan Oil, Gas and Metals National Corporation
LMM	Liberty Metals and Mining
MF2	secondary milling and flotation
NUM	National Union of Mineworkers
PGMs	platinum-group metals
PIC	Public Investment Corporation
PTM	Platinum Group Metals
RBPlat	Royal Bafokeng Platinum
RoM	run-of-mine
RPM	Rustenburg Platinum Mines
SDO	Sylvania Dump Operations
SEZ	special economic zone
SLP	social labour plan
S&P's	Standard and Poors
UG2	upper group two
WPIC	World Platinum Investment Council


Picture by Tharisa

KEY DEVELOPMENTS

September 2018: Platinum prices reach a low of $772/oz.

November 2018: South Africa's Competition Tribunal approves independent, global, precious metals mining company Sibanye-Stillwater's buyout of fellow platinum group metals producer Lonmin.

December 2018: The Association of Mineworkers and Construction Union submits an appeal to the Competition Appeal Court of South Africa calling for the Competition Tribunal's decision on Sibanye-Stillwater's takeover of Lonmin to be overturned.

December 2018: The World Platinum Investment Council says fuel cell electric vehicles could materially boost global platinum demand.

December 2018: Platinum group metals mining, exploration and development company Atlatsa Resources announces a proposed suite of transactions to restructure the business and privatise it.

December 2018: Canadian company Eastern Platinum's Barplats subsidiary successfully commissions a chrome retreatment facility at its Zandfontein operation, in the North West.

February 2019: Minerals Council South Africa launches its 'National Platinum Strategy for South Africa' document, highlighting ways for the country to increase global demand for platinum-group metals.

February 2019: Eastern Platinum announces the first shipment of chrome concentrate from the Barplats Zandfontein retreatment facility, in the North West.

March 2019: JSE-listed Bauba Resources announces that the spiral wash plant at its Moeijelijk chrome mine, in Limpopo, has been operating at its planned throughput of 35 000 t a month since January.

March 2019: Midtier platinum group metals producer Sylvania Platinum completes the secondary milling and flotation module at its Mooinooi operation, in the North West, three months ahead of schedule.

April 2019: Platinum group metals producer Northam Platinum completes a private placement of domestic medium-term notes valued at R1.65-billion.

April 2019: Midtier platinum group metals miner Royal Bafokeng Platinum concludes a rights offer, raising R1.03-billion for the continued expansion of its Styldrift mine and for upgrades to its Maseve concentrator plant, in the North West.

May 2019: Platinum group metals mining and marketing company Anglo American Platinum CEO Chris Griffith says the South African PGMs industry is in crisis, but emphasises that there is also hope for the industry if it takes the appropriate steps.

May 2019: The Competition Appeal Court of South Africa dismisses the Association of Mineworkers and Construction Union's appeal to have the takeover of Lonmin by Sibanye-Stillwater overturned.

May 2019: Northam Platinum increases its existing revolving credit facility by R500-million and secures a new R500-million general banking facility.

May 2019: JSE-listed Bauba Platinum proposes its name be changed to Bauba Resources to better reflect its diversification beyond the platinum mining industry.

June 2019: Sibanye-Stillwater completes the takeover of Lonmin, creating the world's largest platinum and the world's second-largest palladium producer.

June 2019: Northam Platinum gives its approval for the development of the Kukama shaft at the Eland mine, in the North West.

July 2019: South Africa's largest platinum producers and unions start negotiating the latest wage increases for employees in the sector.

July 2019: The potential for South Africa to benefit from its renewable-energy and platinum group metals resources is highlighted, as hydrogen and fuel cells are being promoted as part of solutions to help the world decarbonise its electricity and transport sectors.

July 2019: The late Mineral Resources and Energy Deputy Minister Bavelile Hlongwa says the 2018 Mining Charter III may be reviewed to ensure greater participation by the youth in the mining industry.

July 2019: Anglo American Platinum and Platinum Group Metals establish Lion Battery Technologies to accelerate the development of lithium battery technology using platinum and palladium.

July 2019: *Mining Weekly* editor Martin Creamer provides extensive online coverage of platinum-linked hydrogen and fuel cell opportunities.

August 2019: Anglo American Platinum's Rustenburg Platinum Mines subsidiary concludes the buyout of the Kwanda North and Central prospecting rights, in Limpopo, from Atlatsa Resources for R300-million.

August 2019: Sibanye-Stillwater reports that low production levels and high costs at the Marikana operations, in Limpopo, it acquired from Lonmin are a concern and that a review of the operations will be concluded later in the year.

August 2019: Northam Platinum acquires R1.01-billion worth of Zambezi preference shares from the Public Investment Corporation.

September 2019: Northam Platinum says it plans to buy back more Zambezi preference shares from Coronation Asset Management.

GLOBAL INDUSTRY OVERVIEW

Platinum is not only one of the rarest metals in the world but also one of the most versatile, and its applications are growing. South Africa, Zimbabwe, Russia and North America are the only countries and regions where significant amounts of platinum are found. In South Africa, which produces about 72% of overall global mine supply, and Zimbabwe, which produces about 8% of global mine supply, platinum is recovered as the primary metal alongside other platinum-group metals (PGMs) such as palladium and rhodium.

In Russia, which accounts for about 11% of global platinum output, platinum is produced as a by-product of nickel. Similarly, in North America, platinum is produced as a secondary metal alongside palladium.

According to the World Platinum Investment Council (WPIC), the automotive sector is currently the biggest end-user market for platinum. There is also potential for further growth in demand from this sector as the development of fuel cell vehicles progress.

Jewellery is another significant end-user market, followed by other industrial applications and then investment. Platinum is used in chemicals, electrical, glass, medical and petroleum applications – from laptops and other mobile devices to pacemakers and cancer treatments.

Meanwhile, the rarity of platinum and its unique properties that make it ideal for use in certain applications does not, however, guarantee huge returns for platinum-producing countries and mining operations, with platinum prices having remained under pressure in recent years.

Johnson Matthey reported in its 'PGM Market Report', published in May 2019, that despite the platinum industry having been in a deficit, prices dropped from $1 020/oz in January 2018 to $772/oz in September 2018 before rising to just below $800/oz by the end of the year.

WPIC CEO Paul Wilson noted in the organisation's Platinum Quarterly publication for the first quarter of this year, published in May 2019, that the PGMs mining industry had been subjected to a number of difficult years, as a result of PGM mining operations' economics being driven by the revenues earned from the basket of PGMs mined.

These basket prices have been increasing in recent months on the back of higher palladium and rhodium prices and it remains to be seen if these stronger prices can be maintained.

Noah Capital analyst René Hochreiter told delegates at a PGM Industry Day, in Johannesburg, South Africa, in July 2019 that the PGMs market was heading for a big deficit that would likely boost producers' share prices. SFA Oxford chairperson Stephen Forrest, meanwhile, stated that while the PGMs market performance in early 2019 had been an improvement on the years before, the improvement was unlikely to be sustainable.

While stronger PGM basket prices are positive, South African producers continue to face various challenges that hamper their ability to grow. These include higher costs, electricity supply disruptions, regulatory uncertainty, safety-related stoppages, community engagement challenges and possible industrial action by labour unions.

SUPPLY AND DEMAND

After having recorded its first surplus in six years in 2017, the platinum industry ended 2018 with another surplus of 645 000 oz. WPIC data shows that platinum supply decreased marginally to 8.01-million ounces (2017: 8.02-million ounces), as a result of lower mining supply that was offset, to some extent, by increased recycled supply.

Refined platinum output decreased by 40 000 oz to 6.09-million ounces, as Russia's output decreased by 45 000 oz to 675 000 oz, North American production by 5 000 oz to 360 000 oz and Zimbabwean output by 10 000 oz to 470 000 oz. South Africa's production had increased by 30 000 oz to 4.41-million ounces.

Secondary supply, meanwhile, increased by 20 000 oz to 1.91-million in 2018, driven by a 95 000 oz increase in autocatalyst recycling, at 1.42-million ounces, but offset by a 75 000 oz decrease in platinum jewellery recycling. The WPIC reported in its Platinum Quarterly for the fourth quarter of 2018 that there had been a widespread increase in collected autocatalyst volumes during 2018, as a higher scrap-steel price had contributed to a higher number of end-of-life vehicles being scrapped. As a result of a weak platinum price, less platinum jewellery was recycled.

Platinum demand, meanwhile, decreased 5% to 7.38-million ounces (2017: 7.76-million ounces), as a result of lower automotive, jewellery and investment demand.

Demand from the automotive sector decreased by 6% year-on-year to 3.11-million ounces (2017: 3.32-million ounces), mainly as a result of lower new-vehicle sales in Europe amid new emissions testing legislation, the slowing Italian economy, protests in France and uncertainty about the impact of Brexit on the UK and the broader European automotive industry.

The second-largest demand segment, platinum jewellery, recorded a 4% year-on-year decrease in demand in 2018 to 2.36-million ounces (2017: 2.46-million ounces), driven by overall lower Chinese jewellery consumption and a greater preference among buyers for gold and coloured gold jewellery pieces. In the US, lower taxes contributed to higher economic growth and increased spending power. This benefited the platinum jewellery market.

Investment demand was 15 000 oz in 2018 (2017: 275 000 oz) on the back of a 280 000 oz increase in bar and coin demand, offset by a 245 000 oz decrease in exchange-traded fund (ETF) holdings and a 20 000 oz decrease in stock held by exchanges.

Platinum supply and demand balance ('000 oz)

	2017	2018	2019f
Supply			
Refined production	**6 125**	**6 115**	**6 430**
South Africa	4 380	4 460	4 655
Zimbabwe	480	465	470
North America	365	355	395
Russia	720	665	625
Other	180	170	185
Producer inventory increase (-)/decrease (+)	+30	+0	-25
Total mine supply	6 155	6 115	6 405
Recycling	1 890	1 935	1 985
Autocatalysts	1 325	1 420	1 495
Jewellery	560	510	485
Industrial	5	5	5
Total supply	**8 045**	**8 050**	**8 390**
Demand			
Automotive	3 320	3 105	3 015
Jewellery	2 460	2 355	2 215
Industrial	1 700	1 905	1 910
Investment	275	15	905
Total demand	**7 755**	**7 380**	**8 045**
Supply/demand balance	**290**	**670**	**345**
Above-ground stocks	2 175	2 845	3 335

Source: SFA Oxford and World Platinum Investment Council (September 2019)
f – forecast

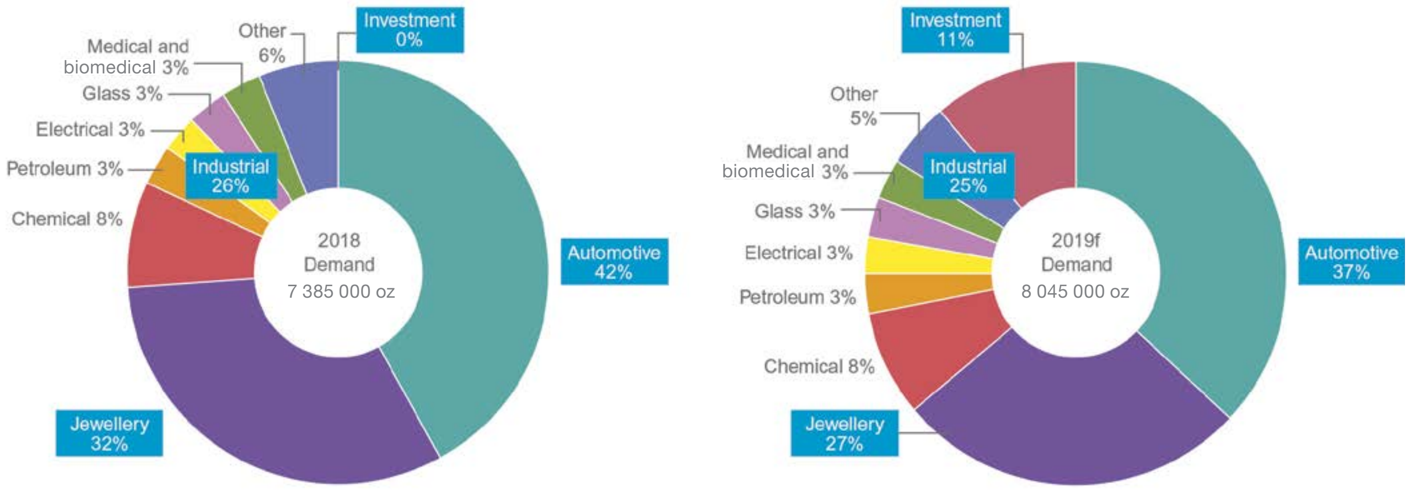
The WPIC noted that ETF holdings had increased only in the third quarter of 2018 and only by 5 000 oz. Contractions in ETF holdings were recorded for the remainder of the year.

Industrial demand, however, increased by 12% year-on-year to 1.91-million ounces (2017: 1.70-million ounces), boosted by higher demand in the petroleum, glass fabrication, medical applications and other end-uses segments.

This was offset, to some extent, by lower demand from the chemical and electrical segments.

For 2019, the WPIC expects the market to end the year with a 345 000 oz surplus. Supply is expected to increase by 4% year-on-year, boosted by a 5% year-on-year increase in refined production, as some projects ramp-up, as well as owing to the refining of metal built up in the processing pipeline during 2018, the WPIC reports.

Demand end-use shares – 2018 vs 2019f



Source: SFA (Oxford)
f – forecast

Recycling is expected to increase by 3% year-on-year, with a significant increase in the recovery of platinum from autocatalysts offsetting a decrease in jewellery recycling.

Demand is expected to increase by 9% year-on-year on the back of higher investment demand. The WPIC notes that investment demand had reached 855 000 oz in the first half of 2019, with 720 000 oz contributed by increased ETF holdings and 135 000 oz contributed by bar and coin purchases. The council expects investment demand for the full-year to reach 905 000 oz. The higher investment demand is likely to offset the 4% and 5% year-on-year decreases in the automotive and jewellery segments, respectively.

Global science and chemicals company Johnson Matthey, however, expects the platinum industry to move into a deficit again during 2019, as primary supply is expected to show a modest increase, offset by the potential impact of electricity supply disruptions in South Africa, as well as possible industrial action as the latest wage negotiations get under way.

Picture by Wesizwe Platinum

The platinum industry is expected to move into a deficit during 2019

SOUTH AFRICAN INDUSTRY OVERVIEW

South Africa holds the world's largest reserves of platinum-group metals (PGMs) and the sector contributes significantly to the overall economy of the country. Minerals Council South Africa reported in September 2019 that the sector had produced about 271 t of PGMs and exported about 244 t of the PGMs produced in 2018. This generated revenue of about R105-billion and contributed about R851-million in royalties. The sector's 167 041 employees were also paid a collective R51-billion in earnings.

Between 1980 and 2015, the Minerals Council notes that the PGMs sector produced 221-million ounces of PGMs, valued at about R1.20-trillion. The industry's performance is, however, declining. In the decade from 2006 to 2016, employment had decreased from 200 000 to 188 000, while production had decreased from 9.90-million ounces of PGMs, valued at about R65-billion, to 8.50-million ounces, valued at about R96.50-billion. Simultaneously, margins had decreased from above 30% to a negative position, while capital expenditure (capex) had decreased from about R20-billion a year, to under R10-billion, according to data published by the Minerals Council.

At the launch of a National Platinum Strategy for South Africa, in February 2019, Minerals Council CEO Roger Baxter stated that the sector was in crisis, as more than 60% of the platinum mining industry was either lossmaking or marginal. He attributed the difficulties to an oversupply in the market, as a result of static new mine supply, weaker demand, increased platinum recycling volumes, domestic labour disruptions, lower productivity and rising costs.

South African platinum

Researchers from the University of the Witwatersrand (Wits) believe they have determined how platinum deposits formed.

Up until now, there have been two competing suggestions for how platinum formed – the gravity-induced settling of crystals on the magmatic chamber floor and crystals growing directly on the floor of the magmatic chamber.

Wits School of Geosciences academic Dr Sofya Chistyakova, along with other collaborators, has determined that the second scenario is correct.

In findings published in June 2019, the researchers stated that when the Merensky reef was forming, portions of the magmatic chamber floor were highly irregular, as a result of potholes, and that the Merensky reef developed as a "rind", covering all depressions on the chamber floor, meaning that the crystals had to have grown from the floor.

Source: *Mining Weekly*

The strategy, which was developed by the Platinum Leadership Forum, comprising members of the Minerals Council, stated that recycling had, as a percentage of overall PGMs supply, increased from 14% in 2006 to 34% in 2016. Demand for platinum had, meanwhile, declined as platinum has been replaced by palladium in the catalytic converters in cars, while Chinese jewellery demand has declined amid a slowing economy.

PGMs producer Anglo American Platinum (Amplats) CEO Chris Griffith told delegates attending the 2019 PGMs Industry Day in May 2019 that demand for PGMs had increased by about 5% a year for 30 years, until the 2008/9 global financial crisis, at which time structural changes in the market negatively impacted on supply and demand and, in turn, also on prices, costs and the profitability of the sector.

Delving further into the headwinds that continue to face the mining sector, including the PGMs industry, in South Africa, he cited unreliable electricity supply, as well as rising electricity costs, as the biggest challenge. He noted that electricity prices had increased by 356% over the past ten years and were expected to increase by a further 34% within the next three years. Griffith said the higher electricity costs had contributed to significant job losses in the mining industry in recent years and cited projections released by the Minerals Council that the gold and platinum mining industries could cut as many as 90 000 jobs over the next three years, nearly 15 000 of them in the PGMs sector, as a result of further electricity tariff increases.

With regard to job losses, Griffith noted that South Africa's high unemployment rate, which is above 27%, is another big challenge for the mining industry, as it contributes to unrest in mining communities. Further job losses in the mining sector will contribute to the growing unemployment rate.

The impact of community protests and illegal mining were also of concern to the broader South African mining industry, with Griffith stating that communities had incredibly high expectations of the industry and felt it was not doing enough to support communities.

Meanwhile, the National Platinum Strategy for South Africa emphasises that the viability of the PGMs industry is under threat, with miners' return on assets, return on investment and gearing, besides other financial indicators, under pressure. The document outlines efforts taken by mining companies in recent years to ensure the industry's viability, including restructuring and asset consolidation, the closure of marginal shafts and job cuts.

However, companies have also cut back on their capex budgets, which means the replacement shafts needed for future growth have been neglected. The document warns that this underinvestment is likely to contribute to lower PGMs demand in the long term, as well as a shrinking South African PGMs mining sector, which will, in turn, put downward pressure on prices.

Professional services firm PwC noted in its 'SA mine: 10th edition' report, published in October 2018, that lower precious metals prices had had a significant impact on the market capitalisations of the gold and PGMs mining sectors, compared with the improved performances by companies in the bulk commodities sectors. The market capitalisation of PGMs companies had decreased by 5% year-on-year in 2018, the report shows.

Despite all the challenges, the Minerals Council and Griffith are optimistic that the industry can turn itself around if it takes the right steps. Griffith stated in May 2019 that the PGMs industry would be able to expand if it continued to invest appropriately, while also committing to market development.

The National Platinum Strategy for South Africa is aimed at ensuring that the PGMs industry can overcome the current crisis and that the right investments are made to help the industry and broader South African economy grow while contributing to job creation.

The strategy notes that, with its current trajectory, the PGMs industry will generate revenue of about $11-billion in 2050; however, with active investment in market development, as well as the support of government to ensure platinum prices reflect platinum's true value, the industry could increase its revenue generation potential to $35-billion in 2050.

Given the country's significant platinum resources and production potential, it is necessary for the country to ensure that it creates global demand by promoting platinum as a store of value and an investment product. By achieving the best outcomes under the proposed platinum strategy, the Platinum Leadership Forum expects South Africa's PGMs sector to produce 260-million ounces of platinum from 2016 to 2050, while direct employment could increase to 376 135 jobs and indirect employment to 639 430 jobs.

The higher PGMs output is expected to contribute more to South Africa's gross domestic product, while supplier industries will grow, transformation will receive a boost, export earnings will grow and taxation will increase, providing the government with access to more revenue to help fund its budget priorities.

The forum believes that, to increase investment demand, South Africa should advance its plans for a platinum coin that will be declared as legal tender. Its introduction could potentially increase yearly demand by more than 20 000 oz, the forum estimates. The forum's strategy document points out that if a platinum rand were to achieve only 10% of the success the gold Krugerrand has, five-million ounces of platinum demand could be created over time.

The Austrian Mint, the UK's Royal Mint and the US Mint have created platinum coins that are selling well. Research undertaken by the World Platinum Investment Council (WPIC) has determined that a South African platinum coin branded either with the Krugerrand or Mandela name would also sell well, but South Africa's Reserve Bank has yet to support the creation of the coins.

Further, the forum suggests that the National Treasury should adopt platinum as a reserve asset and that the International Monetary Fund be lobbied to allow platinum to have the same role as gold in the international monetary system. These actions could potentially result in an incremental one-off demand of 500 000 oz.

In terms of jewellery demand, the forum recommends that a brand presence for men's jewellery be established in India. Marketing of platinum in the Chinese bridal market, as well as the post-marriage gifting segment in China, would also greatly contribute to increasing demand.

To promote platinum industrial demand, the forum suggests that increased venture capital or early-stage funding of companies capable of developing new applications for PGMs will be necessary. Fuel cell electric vehicles (FCEVs) are another significant market opportunity, with the forum recommending that the National Treasury offer incentives for the fabrication of FCEVs in South Africa, while government should increase emission standards to Euro V from the current Euro II to drive the increased uptake of FCEVs over traditional combustion engine vehicles.

GREEN ECONOMY

The WPIC predicts FCEVs will result in material long-term platinum demand. In a 'Platinum Perspectives' research report, published in December 2018, the WPIC noted that initiatives undertaken in various countries to drive the uptake of FCEVs could result in a 40 000 oz/y increase in platinum demand by 2025. China and Japan have already determined how many FCEVs they want included in their overall vehicle fleets in the long term.

The WPIC pointed out that South Korea, Europe and California, in the US, had, meanwhile, opted to focus on expanding their hydrogen refuelling infrastructure to drive higher demand for FCEVs in future. If these plans come to fruition, the council stated, the global FCEV fleet could increase from about 10 000 units at the end of 2018 to 400 000 units by 2025.

As part of efforts to drive increased global demand for platinum, the Platinum Leadership Forum encourages the creation of a national platinum fuel cell strategy to boost South Africa's hydrogen economy. Minerals Council South Africa states that fuel cells and the hydrogen economy hold attractive long-term opportunities for platinum demand.

However, the development of this sector in South Africa is not as advanced as it is in some Asian countries and the council, therefore, suggests that partnering with, and demonstrating the fuel cell and hydrogen technology in the field, in China, will help to accelerate the adoption of the technology.

This is expected to result in limited increased platinum demand in the short term, but a major long-term impact, as the demonstration of such technologies is likely to enable FCEVs to successfully compete with battery electric vehicles.

Mining Weekly editor Martin Creamer in July and August 2019 provided extensive coverage of platinum-linked hydrogen and fuel cell opportunities that could benefit South Africa and the world. Below are some of the developments highlighted by *Mining Weekly*.

The publication reported in July 2019 that fuel cells could greatly benefit South Africa's mining and manufacturing sectors, which have been under strain in recent years.

In an article, Isondo Precious Metals COO Dr Sakib Khan outlined South Africa's unique opportunity to use its significant sun and wind resources to generate not only clean, renewable energy but also – using an electrolyser – hydrogen that can be used in fuel cells to power electric vehicles or store renewable energy for use when the sun does not shine and the wind does not blow. This would help the country decarbonise its electricity generation and potentially its transport sectors.

The PGMs mining industry will also benefit, as platinum and iridium are used in the production of electrolysers and fuel cells.

A Nedbank CIB Market Research conference held in July 2019 also indicated that significant progress was being made to develop fuel cell cars, trucks, buses, trains and ships, indicating that fuel cell technology, globally, was advancing faster than previously thought. E4Tech director Dr David Hart had told delegates that significant advances had been made in fuel cell technology for use in the automotive, power generation and heating sectors.

The work of Hydrogen South Africa (HySA) Infrastructure Centre in commercial solar-to-hydrogen production systems and electrochemical hydrogen compression was also highlighted during the conference.

South Africa can lead platinum-fuelled hydrogen economy

Picture by Creamer Media Chief Photographer Dylan Slater

Minerals Council South Africa CEO Roger Baxter claims that South Africa should be leading the global drive towards a platinum-fuelled hydrogen economy.

"The South African government, at provincial and national level, needs to realise the benefits of a platinum-driven hydrogen economy to become globally competitive.

"South Africa has not only the platinum resources to dominate the global drive but also the technology and skills set to become competitive," he has declared.

Fuel cell technology allows for decentralised power generation at a fraction of the cost and with considerably less negative impact on the environment.

"The uptake of a hydrogen economy can start arresting our negative climate change trajectory. South Africa's ability to supply the platinum for the fuel cell technology will benefit not only the country financially, but also the world environmentally."

Baxter insists that the uptake of a hydrogen-driven economy and fuel cell technology has "enormous medium- and long-term potential" for platinum demand globally.

South Africa currently manufactures 9% of the world's catalytic converters and also has the expertise to produce the platinum coatings, ceramic sponges and canning or exhaust systems required for the fuel cell industry.

The country also accounts for 71% of the world's primary platinum supply, although the surplus of the past few years has placed South African mines under threat of closure. While substantially less than 2018's 800 000 oz surplus, this year's expected 350 000 oz will still be a significant overflow.

Amid South Africa's platinum endowment and lagging demand globally, the Minerals Council has drafted its Minerals Council South Africa National Platinum Strategy, which, through its five stages of strategy development considerations, should assist in uplifting the platinum sector and, subsequently, establishing a local fuel cell industry.

Baxter has highlighted that the benefits of the platinum strategy are multifaceted, as it assists in "greening the planet", creating an avenue for demand in terms of fuel cells and jewellery and, thereby, an opportunity for investment. There will also be greater demand because of new products used in industrial applications.

He has also suggested that existing transport systems, such as the Rea Vaya bus rapid transit system and others in metropolitan cities, should be used as a foundation to build on the fuel cell industry. "The technology required to convert the buses is not as advanced as one would think," Baxter comments.

Countries such as the US, China and, most notably, Japan have taken up the fuel cell-driven vehicle, and "are successfully running with the concept", he has said.

The Minerals Council has further recommended that government makes an overt statement about the adoption of a hydrogen strategy for South Africa or at the least for a province, which could then be used as a case study.

"Our entire strategy is based on working collaboratively and smartly with a number of role players, including government to drive growth in platinum demand," Baxter has stated.

Channels of communication have been opened with Gauteng Premier David Makhura on a provincial level, as well as Mineral Resources and Energy Minister Gwede Mantashe regarding a national uptake of a platinum-based hydrogen economy and the advent of fuel cells as the "solution to fix all problems".

The platinum industry in South Africa is currently worth \$10-billion, and by 2050 – through the successful implementation of the council's five-step platinum strategy – could amount to \$35-billion.

"We, as South Africans, will realise the real benefit of platinum only if we have these pathways at local level, where we can be a reliable supplier to the global marketplace," Baxter avers.

Mining Weekly also quoted HySA director Dr Dmitri Bessarabov in August 2019 as saying that fuel cell electrical equipment, which has zero emissions, could replace diesel-powered equipment in mining operations. This would lead to lower underground mine ventilation costs while reducing health risks for mine employees. HySA has developed a clean mining ventilation test facility.

Meanwhile, Mark Cutifani, the CEO of Anglo American, which is Anglo American Platinum's (Amplats') parent company, said in July 2019 that there was potential for South Africa to become a leader in the global clean electrification space, given its renewable-energy resources and ability to produce hydrogen from those renewables. He added South Africa's PGMs industry could be at the forefront of clean electrification.

Royal Bafokeng Platinum CEO Steve Phiri in August 2019 told *Mining Weekly* that he too saw potential for the country to successfully build a hydrogen economy that would enable it to decarbonise its transport sector, but stressed that the country should not wait too long to enter this space.

Hiten Parmar, director of uYilo Electric Mobility, an initiative of the Technology Innovation Agency, told the publication in August 2019 that South Africa needed to develop a national roadmap for platinum-catalysed hydrogen FCEVs to complement the electric vehicle roadmap that had been drawn up in 2013. The proposed new roadmap would have to define short- to long-term steps that are needed to harness platinum reserves and develop the hydrogen economy.

Amplats CEO Chris Griffith, meanwhile, in July 2019 emphasised the importance of investment by the company in the green economy. He highlighted during a presentation of the company's results for the six months ended June 30, 2019, that the company was considering opportunities to introduce the use of fuel-cell trucks within its mining fleet, adding that the company expected to have the largest fuel cell truck in the world operating at its operations.

He further noted that the company was considering the construction of solar power plants to support some of its mining operations in South Africa and Zimbabwe. Fellow South African PGMs producer Sibanye-Stillwater is also considering investing in solar power for its West Wits operation.

Meanwhile, Amplats in July 2019 also welcomed the news that vehicle manufacturer Toyota Motor Corporation had agreed to co-fund the development of the PGMs market by joining AP Ventures – a venture capital fund established by Amplats and South Africa's Public Investment Corporation in 2018 to promote technologies that depend on PGMs. Mitsubishi Corporation is also an investor in AP Ventures. In September 2019, French automotive supplier Compagnie Plastic Omnium became the latest partner to join AP Ventures by investing $30-billion in the AP Ventures Fund II.

Amplats and Canadian PGMs project developer Platinum Group Metals (PTM) also established Lion Battery Technologies in July 2019, which had entered into an agreement with Florida International University, in Florida, in the US, to further research the potential of using platinum and palladium to improve lithium air and lithium sulphur battery chemistries, which, in turn, will improve their discharge capacities and cyclability.

Amplats stated at the time that lithium oxygen and lithium sulphur batteries were able to perform much better than lithium-ion batteries. PTM president and CEO R Michael Jones commented at the time that Lion's research and development could potentially boost demand for PGMs and, therefore, benefit its Waterberg PGM project, in Limpopo.

Mining Weekly also reported in July 2019 that the proposed Platinum Valley Special Economic Zone (SEZ), which is set to be established in South Africa's North West province, was expected to be the hub of PGM beneficiation initiatives in the country and will be focused on fuel cell development. Platinum Valley SEZ project executive Davis Sadike and North West Development Corporation research and innovation manager Hantie Hoogkamer told the publication that the first initiative to be launched at the SEZ would likely involve platinum three-dimensional printing.

In another development, a South African company, Hydrox Holdings, has patented a water electrolysis technology capable of using acid mine water, seawater or brackish water to produce hydrogen. *Mining Weekly* explained in an August 2019 article that 'green' hydrogen was produced by splitting water into hydrogen and oxygen. Hydrox's technology is expected to produce hydrogen at lower than R100/kg, which should make it cost competitive with petrol.

Meanwhile, investment firm Pallinghurst Group, which owns a controlling interest in Sedibelo Platinum Mines, has also set its sights on battery metals and fuel cell opportunities. *Mining Weekly* reported in July 2019 that the firm had set aside $1-billion to invest in battery- and fuel cell-related materials going forward.

REGULATORY ENVIRONMENT

South African miners expect a much-improved regulatory environment since the appointment of Gwede Mantashe as Mineral Resources and Energy Minister in February 2018.

Unlike his predecessor, Mosebenzi Zwane, Mantashe opted to negotiate with the mining sector before publishing the latest iteration of the Mining Charter – Mining Charter III – in September 2018. His efforts have succeeded in rebuilding some trust with the country's mining industry; however, while the negotiated charter has gone a long way towards trying to find the middle ground between the various stakeholders, there are still areas of concern.

Mining Weekly recounted in July 2019 that one of the areas of concern was the impact the charter's implementation would have on suppliers to the mining industry. Suppliers also need to ensure that they are meeting empowerment requirements to secure contracts from the mines.

Another concern that has often been raised is the impact of the charter on junior miners, but Minerals Council South Africa says it has helped to ensure specific provisions are included in the charter to help the junior mining sector grow. *Mining Weekly* reported in May 2019 that there were hundreds to thousands of junior miners listed on stock exchanges in other countries, while there were about only ten such companies listed on the JSE.

The article noted that the Minerals Council had established a Junior and Emerging Miners' Desk to provide an opportunity for junior miners to have their voices heard in national debates about mining policy.

Among the provisions catered for in the charter was an exemption from employment equity and ownership-requirements, including exemption from ownership requirements for exploration companies until they start the development of a proven resource. The exemption is important, as junior miners do not have the financial resources to meet onerous regulatory agreements in the same way that large-scale miners do.

In April 2019, Minerals Council South Africa filed a court application to have some clauses of the charter, including provisions pertaining to the continuing consequences of previous empowerment transactions, reviewed and set aside. The council, nevertheless, emphasises that it remains in talks with Mantashe to resolve the disagreement about the provisions.

Meanwhile, South African opposition political party the Democratic Alliance (DA) has, on more than one occasion, called for the charter to be abolished. *Mining Weekly* quoted DA shadow Mineral Resources and Energy Minister James Lorimer in June 2019 as stating that government needed to stop interfering in the mining industry and simplify legislation rather than add more onerous demands, at a time when the industry was shedding jobs and achieving lower production. Lorimer further stated that the charter disincentivised investment.

Market analyst Paul Miller agrees that the charter will not encourage greater investment in South Africa's mining industry. According to a June 2019 article published by online publication Miningmx, Miller told delegates at the Junior Mining Indaba that junior miners operating in other countries were often offered tax incentives to ensure they invested, while, in South Africa, no such incentives existed.

The late Mineral Resources and Energy Deputy Minister Bavelile Hlongwa believed that the charter had not done enough to benefit the youth. During the Mineral Resources and Energy Budget Vote in Parliament in July 2019, she hinted that the charter might again be reviewed to better include the youth.

WAGE NEGOTIATIONS

South Africa's largest platinum miners started negotiations with labour unions about wage increases for employees in the sector in July 2019. Anglo American Platinum (Amplats), Impala Platinum (Implats) and Sibanye-Stillwater were expected to face tough negotiations, particularly with the Association of Mineworkers and Construction Union (AMCU), which announced in June 2019 that it would seek a basic minimum wage for its members of R17 000 a month. This represents an increase of about 48% on the basic minimum wage of R12 500 the union has been seeking since 2012.

At the time of announcing its plans to ask for a R17 000 a month basic wage from platinum mining companies, AMCU president Joseph Mathunjwa said this was the minimum amount an employee needed as a basic salary, taking into consideration the increased cost of living.

In response, Sibanye said the demand was unaffordable, pointing out that, contrary to what some people believed, the industry had not been generating huge profits in recent years. It explained that PGM basket prices had risen only above the cost of production in recent months, mainly as a result of higher palladium and rhodium prices. It further pointed out that costs, including electricity costs, were increasing and were likely to put further pressure on the industry, which had already shed thousands of jobs in recent years, while more job cuts were on the cards.

Amplats and Implats agreed that the platinum mining industry was still under strain, but also acknowledged that employees' disposable income was under pressure.

Nevertheless, Amplats CEO Chris Griffith noted in May 2019 that mineworkers were now, alongside State-owned power utility Eskom's employees, the highest paid industrial workers in the country. He had also highlighted that nearly 47% of the value created across the mining industry went to employees, compared with only 6% that went to shareholders. A further 24% of the value created was paid to government in the form of taxes and royalties.

News organisation Business Day in July 2019 quoted Griffith as stating that, although the company's profits for the six months ended June 30, 2019, had improved substantially, it was not going to implement unsustainable increases in its labour costs. He said the increase AMCU was seeking would be damaging to the industry and warned that it might lead to the closure of Amplats' Amandelbult mine and result in further job losses. Griffith said the company would consider inflation-related wage increases.

Meanwhile, negotiations between AMCU and Sibanye are likely to be particularly difficult, following a five-month strike by AMCU employees at Sibanye's gold operations that started in November 2018 and ended in April 2019. The strike at Sibanye's gold operations had also been as a result of wage negotiations. Sibanye and AMCU returned to the courts on numerous occasions before AMCU was eventually forced to end the strike.

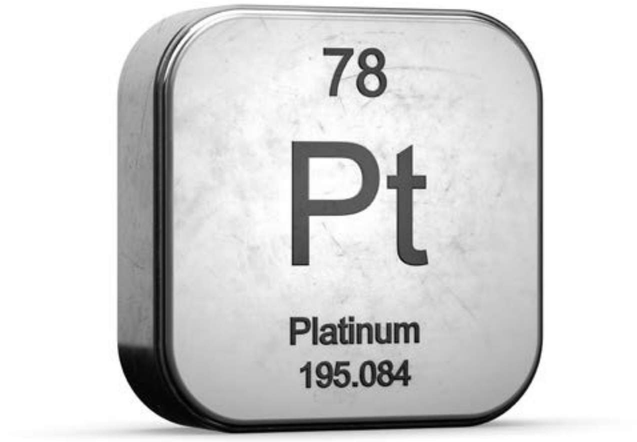
As negotiations were continuing, AMCU warned during a media briefing in mid-August 2019 that it might embark on a strike at Sibanye's South African platinum operations after having received a disappointing wage increase offer from the miner. A contentious matter for the union was a disagreement with Sibanye about wage increase negotiations for employees at the operations Sibanye had recently acquired from Lonmin. *Mining Weekly* reported that, according to the union, the precious metals mining company wanted to conduct negotiations for employees at Rustenburg Platinum Mines separately from negotiations for its other operations. The union also said the offers made by Sibanye were below inflation.

In September 2019, Amplats and Sibanye-Stillwater indicated that they might need mediators to help South African wage talks move forward after AMCU declared a dispute. The producers said at the time that they were considering bringing in mediators to resolve the standoff internally rather than seeking arbitration from the Commission for Conciliation, Mediation and Arbitration.

AMCU rival, the National Union of Mineworkers (NUM), is, meanwhile, seeking to increase its membership numbers in the platinum sector. The union was the largest representative union at the platinum mines until 2012. While not much has been reported about the NUM's wage increase demands, Bloomberg reported in June 2019 that the union had asked Amplats for a 15% increase in employees' wages.

Picture by Bloomberg

Platinum mining companies have argued that union wage demands are unaffordable



MAIN PARTICIPANTS

Anglo American Platinum (Amplats), Impala Platinum (Implats) and Sibanye-Stillwater are the three biggest platinum and platinum group metals (PGMs) producers in South Africa.

ANGLO AMERICAN PLATINUM

Amplats is a subsidiary of the Anglo American group and is a primary producer of PGMs, including platinum, palladium, rhodium, iridium, ruthenium and osmium. It operates across the entire value chain and owns interests in several underground mines, one openpit mine and three smelters.

Amplats has, in recent years, restructured and simplified its portfolio of projects to ensure an attractive investment proposition and competitive returns. During the 2018 financial year, it made further progress in restructuring its portfolio with the sale of its 33% interest in the Bafokeng Rasimone Platinum Mine joint venture (JV) to JV partner Royal Bafokeng Holdings in July 2018. It also acquired full ownership of the Mototolo mine in November 2018 after buying out the 40.20% and 9.80% stakes in the Mototolo JV held by Glencore and Kagiso respectively.

The company is now seeking to create further value for the business by realising the full value of its operations; investing in fast-payback projects, technology and innovation at its mines; undertaking expansion projects; and helping to develop global markets for PGMs.

In terms of realising the full value of its operations, Amplats says it plans to operate its assets and equipment at levels beyond

Anglo American Platinum		
CEO Chris Griffith/ Chairperson Norman Mbazima		
	Financial year ended December 2018	**Financial year ended December 2017**
Headline earnings/(loss)	R7.59-billion	R3.89-billion
Refined platinum production	2.40-million ounces	2.51-million ounces
Refined PGMs production (6E)[1]	4.78-million ounces	5.12-million ounces
	Six months ended June 2019	**Six months ended June 2018**
Headline earnings/(loss)	R7.38-billion	R3.36-billion
Refined platinum production	1.10-million ounces	1.08-million ounces
Refined PGMs production (6E)[1]	2.30-million ounces	2.18-million ounces

Source: Anglo American Platinum's Integrated Annual Report 2018 and interim results 2019
[1]6E – platinum, palladium, rhodium, iridium, ruthenium and gold

what the industry considers possible. As part of this goal, Amplats plans to increase the rope shovel performance at its Mogalakwena plant, in Limpopo, to 45-million tonnes a year, compared with the current 26-million tonnes a year; increase throughput at its concentrators by more than 10%; increase the concentrators' operating times to more than 94%; and increase concentrator recoveries to more than 83%.

The miner is also investing in FutureSmart Mining technologies and digitalisation to unlock further value at its operations. The FutureSmart Mining technologies that are being developed and deployed include coarse-particle filtration, advanced fragmentation and shock-break technology for the concentrators, and fine recovery of chrome and PGMs.

Amplats is investing R1.50-billion to R1.80-billion on these value-enhancing efforts and technologies in 2019. This will be followed by investments of R2-billion for each of 2020 and 2021.

Further, Amplats is continuing with project studies into possible expansion opportunities at the Mogalakwena mine and the Der Brochen project, also in Limpopo, while investing in sulphur dioxide abatement projects at its smelters, chrome plant expansions, debottlenecking efforts and replacement projects.

Amplats says its palladium-rich Mogalakwena mine is the only major PGMs openpit operation globally. Initial project opportunity studies have shown that a third concentrator expansion could significantly improve the asset's net present value and increase returns; however, further studies have shown that there are also other options available to Amplats to further improve the operation.

These options include debottlenecking the South Concentrator, underground mining options and the deployment of new technology. Amplats is assessing the various options through further project studies.

Meanwhile, full ownership of the Mototolo mine is expected to enable Amplats to unlock synergies between the Mototolo and Der Brochen resources and, by July 2019, project studies were under way to assess the most valuable options. At that time, Amplats was considering replacement and growth options for the combined Mototolo/Der Brochen operation. Amplats believes combining Mototolo with the Der Brochen resource will extend Mototolo's life to beyond 30 years, compared with its five-year mine life.

In terms of developing and expanding the market for PGMs, Amplats is a member of the Platinum Guild International and the World Platinum Investment Council. It is also, through a new venture capital vehicle, AP Ventures, investing in the development of future growth areas, including fuel cells, hydrogen and clean energy solutions.

Fuel cell partnership

Toyota Motor Corporation and Sumitomo Mitsui Banking Corporation in July 2019, through their Mirai Creation Fund II, partnered with AP Ventures, a venture capital fund backed by Anglo American Platinum and the Public Investment Corporation, which provides investors with access to technology that is made from platinum-group metals and that provides solutions for many of the world's challenges. The Mirai Creation Fund II will invest in AP Ventures' Fund II, for which AP Ventures is still assessing possible new investment opportunities.

Source: *Mining Weekly*

Financial and operational performance: Year ended December 31, 2018

Amplats achieved a 95% increase in headline earnings to R7.59-billion for the 2018 financial year, ended December 31, 2018, compared with headline earnings of R3.89-billion for the 2017 financial year. Earnings before interest, taxes, depreciation and amortisation (Ebitda) increased by 21% year-on-year to R14.50-billion (2017: R12-billion).

Net sales revenue increased by 14% year-on-year to R74.60-billion, from R65.70-billion, as a result of a 13% year-on-year increase in the PGMs basket price to $2 219/oz, compared with the basket price of $1 996/oz achieved in the prior financial year.

The PGMs miner ended the year with net cash of R2.90-billion, compared with net debt of R1.80-billion at the end of 2017.

Meanwhile, improved efficiencies and higher productivity resulted in a 4% year-on-year increase in total PGMs metal-in-concentrate output to 5.19-million ounces for 2018 (2017: 5.01-million ounces), while platinum metal-in-concentrate production also increased by 4% to 2.48-million ounces (2017: 2.40-million ounces).

Refined PGMs and platinum production, however, decreased by 6% to 4.78-million ounces (2017: 5.12-million ounces) and by 4% to 2.40-million ounces (2017: 2.51-million ounces) respectively for 2018, mainly as a result of the planned rebuilds of Amplats' Mortimer and Polokwane smelters, in Limpopo, the commissioning of the Unki smelter, in Zimbabwe, and maintenance work having been undertaken at other processing plants. This resulted in a build-up of work-in-progress inventory, which, when processed, should contribute to higher refined production during the 2019 financial year.


Picture by Anglo American Platinum

Unki smelter

Amplats expects its refined PGMs production for 2019 to be between 4.60-million and 4.90-million ounces and its refined platinum production to be between 2.20-million and 2.30-million ounces.

Financial and operational performance: Six months ended June 30, 2019

For the six months ended June 30, 2019, Amplats achieved an 82% year-on-year increase in Ebitda to R12.40-billion, compared with Ebitda of R6.80-billion in the first half of the prior financial year, as a result of higher dollar metal prices and a weaker rand:dollar exchange rate.

Headline earnings increased by 120% year-on-year to R7.40-billion, from R3-billion in the prior comparable period, mainly as a result of a 33% increase in the rand basket price for PGMs to R38 305/oz, compared with R28 695/oz achieved in the prior comparable period. The increased rand basket price came on the back of a 16% increase in the dollar basket price to $2 685/oz, compared with the dollar basket price of $2 318/oz in the prior comparable period.

Net cash increased to R6-billion, from R2.90-billion in the prior comparable period, while revenue increased by 28% to R42.90-billion, from R33.50-billion in the prior comparable period, as a result of the higher rand basket price for PGMs.

The miner had, in February 2019, increased its dividend payout ratio to 40% of headline earnings, from the previous ratio of 30% of headline earnings. Its solid financial performance in the 2019 interim period prompted the miner to declare an R11-a-share dividend, in line with its payout ratio of 40% of headline earnings.

Meanwhile, Amplats' production for the six-month period was stable, despite electricity supply disruptions by power utility Eskom and strike action at Mototolo. PGMs-in-concentrate production decreased by 2% year-on-year to 2.15-million ounces, compared with the 2.20-million ounces produced in the first half of the 2018 financial year.

Refined PGMs production increased by 6% year-on-year to 2.30-million ounces, compared with the 2.18-million ounces produced in the prior comparable period, while refined platinum production increased by 2% year-on-year to 1.10-million ounces, compared with 1.08-million ounces in the prior comparable period.

Meanwhile, Rustenburg Platinum Mines concluded the acquisition of the Kwanda North and Central blocks' prospecting rights from Atlatsa Resources for R300-million in cash in August 2019. *Mining Weekly* reported at the time that the acquisition of the blocks would boost the Mogalakwena mine, where metal credits resulted in platinum being produced at a cost of -$292/oz during the six months to June 30.

Publication Miningmx reported that the finalisation of the transaction also opened the door for Amplats to continue with its plans to sell its interest in the Bokoni joint venture. Spokesperson Jana Marais told the publication that Amplats had engaged independent experts to complete a mine, process and infrastructure study to support a new mine design for Bokoni as part of Amplats' plans to dispose of its interest in the Limpopo mine.

Capex

Amplats is committed to disciplined capital expenditure (capex). Its capex increased to R4.70-billion in 2018, from R4-billion in 2017. Stay-in-business (SIB) capex was unchanged at R3.30-billion.

Amplats invested a further R2.10-billion in capex in the six months ended June 30, 2019 – a 14% increase on the R1.80-billion invested in the first half of the 2018 financial year. SIB capex for the interim period remained unchanged at R1.30-billion.

Amplats invested R300-million in project capital during the interim period, with the spend focused on a new chrome module at the Amandelbult mine, which comprises the Tumela and Dishaba mines, and on the 15E mechanised mining section at the Tumela mine.

Amplats' SIB capex for the 2019 financial year is expected to be between R3.40-billion and R3.70-billion, while its project capital will be between R1.50-billion and R1.80-billion.

IMPALA PLATINUM

JSE- and Frankfurt Stock Exchange-listed Impala Platinum (Implats) produces platinum from its operations on the Bushveld Complex of South Africa. It also holds a majority stake in Zimplats, which has operations on the Great Dyke, in Zimbabwe.

In a low-platinum-price environment, Implats has been focusing on ensuring its production is profitable by restructuring some of its operations. Key to achieving that goal will be the restructuring of its Impala Rustenburg operations. Implats announced the results of a strategic review into the Impala Rustenburg operations in August 2018, which determined that the operations needed to be made leaner and more profitable to ensure the continued success of the company and return it to a cash neutral/positive position by the 2021 financial year.

Implats has, therefore, decided to reduce the number of operating shafts within Impala Rustenburg from ten to six. This will result in a decrease not only in output from about 750 000 oz/y to about 520 000 oz/y, but also the labour complement to about 27 000 from the current 40 000.

The restructuring, which will be completed in phases until the end of Implats' 2021 financial year, is expected to result in Impala Rustenburg's comprising only high-quality, long-life orebodies that can be mined at a lower operating cost and a lower capital intensity.

Picture by Impala Platinum

Impala Platinum has been focusing on ensuring its production is profitable by restructuring some of its operations

Implats has initiated a formal Section 189 process with labour regarding the planned job cuts. It expects natural attrition to help lower the number of employees that will eventually be affected by the job cuts. The miner is also trying to minimise forced job losses by transferring employees to vacant positions at some of its other shafts, such as the 16 and 20 shafts, as well as through reskilling opportunities and voluntary separation packages.

The PGMs miner is also considering possible options to improve the profitability of the Impala Rustenburg shafts that are due for closure, and will consult with stakeholders before a final decision is taken to close an unprofitable shaft.

In September 2019, the company said it would, in light of continuing improvements in PGM prices and market conditions, re-evaluate the strategic direction with regard to its Impala Rustenburg operations. The company would consider outsourcing some of the shafts to interested parties instead of selling them.

It has also acquired a 15% interest in the Waterberg JV project, in which Canadian firm Platinum Group Metals is a majority shareholder. Implats believes that the Waterberg project fits well with its strategy of investing in lower-cost and shallow assets

Impala Platinum		
CEO Nico Muller / Chairperson Mandla Gantsho		
	Financial year ended June 2019	**Financial year ended June 2018**
Headline earnings/(loss)	R3.04-billion	(R1.23-billion)
Refined platinum production	1.53-million ounces	1.47-million ounces
Refined PGMs production (6E)[1]	3.07-million ounces	2.92-million ounces

Source: Impala Platinum Consolidated Annual Results 2019.
[1]6E – platinum, palladium, rhodium, iridium, ruthenium and gold

where mechanisation is an option. The project's high palladium content is considered another significant benefit for the company.

Financial and operational performance: Financial year ended June 30, 2019

Higher sales volumes and stronger PGM prices boosted Implats' results, with revenue having increased by 36%, or R12.80-billion, year-on-year to R48.63-billion (2018 financial year: R35.85-billion). R4.40-billion of the increase was the result of higher sales volumes, with sales in the prior financial year having been negatively impacted on by furnace maintenance and a transformer fire that resulted in a build-up of inventory.

Further, R3.70-billion of the increase was the result of higher realised dollar metal prices, with rhodium revenue having increased by R2.80-billion and palladium revenue by R2.50-billion. Higher iridium and ruthenium prices also contributed gains of R383-million and R342-million respectively. This was, however, offset to some extent by a R2.30-billion negative impact as a result of a 12% year-on-year decrease in platinum prices. Nevertheless, the total dollar revenue per platinum ounce sold had improved by 11% year-on-year to $2 237/oz.

Lastly, R4.60-billion of the revenue increase was the result of the rand having weakened to an average of R14.20 to the dollar, compared with R12.82 to the dollar in the 2018 financial year.

Gross profit increased fivefold to R6.83-billion (2018 financial year: R1.14-billion). The company also reported headline earnings of R3.04-billion, a significant turnaround on the headline loss of R1.23-billion reported for the 2018 financial year.

From an operational perspective, Implats delivered a strong performance, mainly as a result of the ongoing restructuring at Impala Rustenburg. Group refined PGMs production increased by 5% year-on-year to 3.07-million ounces (2018 financial year: 2.92-million ounces), while refined platinum production increased by 4% year-on-year to 1.53-million ounces (2018 financial year: 1.47-million ounces).

Despite the closure of 4 Shaft and the scaling down of production at 1 Shaft as part of the restructuring at Impala Rustenburg, the operation increased its mill throughput by 2% year-on-year to 11.21-million tonnes. Implats attributed the increased mill throughput to improved delivery at 12 Shaft and 14 Shaft and a ramp-up in volumes from 16 Shaft and 20 Shaft.

Impala Rustenburg's refined platinum production increased by 30% year-on-year to 754 000 oz, compared with the 581 000 oz produced in the 2018 financial year.

Implats reported in September 2019 that the first phase of the restructuring plan at Impala Rustenburg had been completed during the financial year, with employee numbers having decreased by 1 300. However, only 117 were as a result of forced retrenchments.

Implats expects employee numbers to decrease further during the 2020 financial year as 9 Shaft is closed down and as a "contracted out" mining model is implemented at 1 Shaft as its output ramps down.

At the Marula mine, in the North West, gross tonnes milled decreased by 4% year-on-year to 1.77-million tonnes. The operation had been negatively impacted on by a seven-day community stoppage during the third quarter of the financial year. Platinum-in-concentrate production decreased by 2% year-on-year to 83 000 oz, compared with the 85 000 oz produced in the 2018 financial year.

Zimplats, in which Implats holds an 87% interest, delivered a consistent performance, with milled tonnages having remained stable at about 6.49-million tonnes. Platinum-in-matte production also remained stable at about 270 000 oz.

Meanwhile, the Mimosa mine, in Zimbabwe, which is a JV between Implats and Sibanye-Stillwater, also reported stable milled tonnages of about 2.81-million tonnes. Recoveries were, however, negatively affected by power interruptions to the milling circuit, resulting in platinum-in-concentrate production having decreased by 2% year-on-year to 122 000 oz.

Challenging operating conditions were encountered at the Two Rivers mine JV, in Limpopo, during the financial year, with the continued mining into low-grade split-reef areas and resultant lower recoveries having contributed to lower platinum production. Tonnes milled were stable at about 3.41-million tonnes, but platinum-in-concentrate production decreased by 9% year-on-year to 147 000 oz.

Meanwhile, Impala Refining Services had received 801 000 oz of platinum-in-concentrate – 10% less than the 889 000 oz received in the 2018 financial year. Refined platinum production decreased by 13% year-on-year to about 772 000 oz.

Capex

Implats' capex decreased by 18% to R3.79-billion in the 2019 financial year, compared with the R4.61-billion invested in the 2018 financial year.

Impala Rustenburg's capital spend decreased by R761-million to R2-billion as a result of the progress made with the 16 Shaft and 20 Shaft projects. Construction of 20 Shaft was completed during the 2019 financial year, while 16 Shaft had reached 92% completion. Implats has spent R7.40-billion of the R7.90-billion budget at 16 Shaft, which is expected to reach steady-state production of 180 000 oz/y of platinum from June 2022.

Implats has invested R7.90-billion on the development of 20 Shaft. A sustained period of underdelivery, however, prompted a review of the shaft's production potential. Implats has subsequently strengthened the leadership capacity at the shaft and instituted strict quarterly performance parameters to ensure targets are being met.

Zimplats, meanwhile, invested R110-million less in capex as the Bimha project had been concluded.

Marula's capex, however, increased by R51-million as a result of the start of construction on a new tailings dam.

SIBANYE-STILLWATER

Sibanye-Stillwater, which has its headquarters in South Africa, has, since 2016, developed from being a South African gold producer to a precious metals miner with gold and PGM operations in the US, South Africa and Zimbabwe. Following the completion of its buyout of fellow South African platinum miner Lonmin in June 2019, the company is now the largest primary producer of platinum and the second-largest producer of palladium globally.

Its operations in the US include East Boulder and the Stillwater mines, in Montana, and the Columbus metallurgical complex.

Leadership change

Dr Vincent Maphai took up the position of chairperson of Sibanye-Stillwater on June 1, 2019. This followed the resignation of former chairperson Sello Moloko at the end of May 2019. Moloko resigned to focus on other responsibilities, including the continued development of Thesele Group, which he founded in 2005.

Source: *Mining Weekly*

In South Africa, it owns the Kroondal, Rustenburg and Platinum Mile operations on the western limb of the Bushveld Complex and is a JV partner in the Mimosa mine, located on the southern portion of the Great Dyke, in Zimbabwe. It also operates the Platinum Mile retreatment facility, in Rustenburg. It has also acquired, as part of its buyout of Lonmin, the Marikana mining and processing operations on the western limb of the Bushveld Complex.

Its South African gold operations include the Driefontein, Kloof, Cooke and Beatrix mines.

Financial and operational performance: Financial year ended December 31, 2018

During the group's financial year ended December 31, 2018, various safety incidents at its gold operations negatively impacted on its gold output and, therefore, also its financial performance, with the US PGM operations becoming its biggest source of earnings.

The US operations contributed about 50% of the group's adjusted Ebitda of R8.37-billion. Ebitda was, however, still lower than the R9.05-billion achieved in the 2017 financial year.

Sibanye-Stillwater		
CEO Neal Froneman / Chairperson Dr Vincent Maphai		
	Financial year ended December 2018	**Financial year ended December 2017**
Adjusted Ebitda[1]	R8.37-billion	R9.05-billion
2E PGMs production[2]	592 608 oz	373 356 oz
4E PGMs production[3]	1.18-million ounces	1.19-million ounces
	Six months ended June 30, 2019	**Six months ended June 30, 2018**
Adjusted Ebitda[1]	R2.07-billion	R3.90-billion
2E PGMs production[2]	284 773 oz	293 959 oz
4E PGMs production[3]	627 991 oz	569 166 oz

Source: Sibanye-Stillwater's Integrated Annual Report 2018 and operating and financial results for the six months ended June 30, 2019.
[1]Adjusted Ebitda – earnings before interest, taxes, depreciation or amortisation.
[2]Platinum and palladium produced at the US PGM operations.
[3]Platinum, palladium, rhodium and gold produced at the South African PGM operations.

The US PGM operations produced 592 608 oz (2017: 373 356 oz) of platinum and palladium (2E) during the financial year, as a result of an ongoing build-up of production at the Blitz mine, in Montana, which forms part of the Stillwater operations, and record output from the East Boulder mine.

At the Blitz mine, three stope blocks were commissioned during 2018, while a further two stope blocks will be commissioned during 2019. By late 2021, ten stopes will have been commissioned at the mine, which will result in an additional 300 000 oz/y of 2E production from 2022.

Sibanye has also approved the Fill the Mill (FTM) project at the East Boulder mine. The FTM project will add about 40 000 oz of 2E to the mine and the Columbus metallurgical complex's yearly production from 2020.

The project, which will entail the incremental expansion of mining and support facilities at the mine and metallurgical complex, is also aimed at reducing the East Boulder mine's operating costs by 5% over the project's ten-year operating life.

The Columbus metallurgical complex, meanwhile, processed 686 592 oz (2017: 517 148 oz) of recycled platinum, palladium and gold (3E).

Meanwhile, Sibanye entered into an agreement with exploration company Generation Mining in June 2019, giving the exploration company the right to acquire a 51% interest in Sibanye's Marathon project, in Ontario, Canada, for C$3-million in cash and 11.05-million Generation Mining shares.

The Marathon property comprises 44 mining leases and 83 contiguous claims. Sibanye had acquired the project when it bought Stillwater for $2.20-billion in 2017. The disposal of the stake in the project enables Sibanye to retain focus on its core US operations.

Sibanye's South Africa PGM operations delivered 1.18-million ounces of platinum, palladium, rhodium and gold during the 2018 financial year, slightly lower than the 1.19-million ounces produced in the 2017 financial year.

Financial and operational performance: Six months ended June 30, 2019

Sibanye's South African and US PGM operations delivered improved financial results in the interim period, offsetting the losses incurred at the company's South African gold operations as a result of the extended strike by Association of Mineworkers and Construction Union (AMCU) members. The group's adjusted Ebitda decreased to R2.07-billion, from R3.90-billion in the six months ended June 30, 2018.

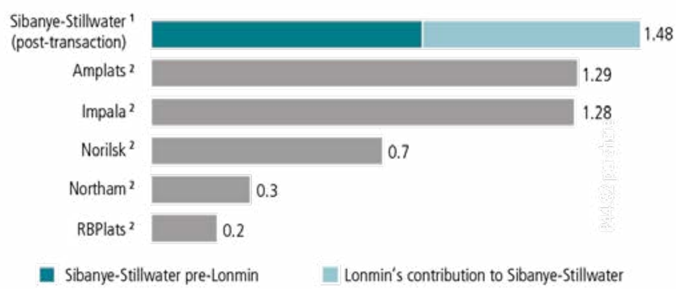
The decrease was driven by the losses incurred by the South African gold operations, which reported an adjusted loss before interest, taxes, depreciation and amortisation of R2.90-billion, compared with an adjusted Ebitda of R1.01-billion in the prior comparable period.

The US PGM operations increased its adjusted Ebitda by 36% year-on-year to R2.96-billion (six months to June 30, 2018: R1.89-billion), while the South African PGM operations achieved a 106% year-on-year improvement in adjusted Ebitda to R1.06-billion (six months to June 30, 2018: R1-billion).

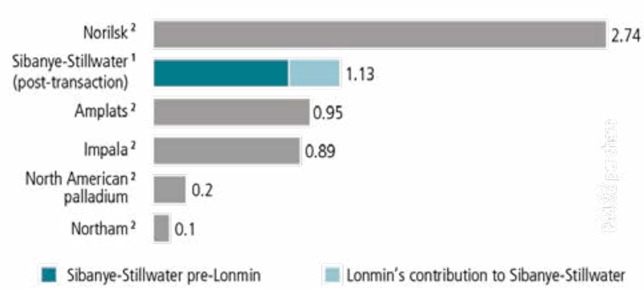
At the US PGM operations, Sibanye implemented a plan to deal with operational issues that had constrained production during the first quarter of the year.

This resulted in a 17% improvement in production and a 13% reduction in costs between the first and second quarters. To deal with poor ground conditions at the Blitz mine, Sibanye is adding cable anchors and shotcreting, which is expected to negatively impact on production in the short term.

Ranking of 2018 platinum production (in million ounces)



Ranking of 2018 palladium production (in million ounces)



[1] 2018 full year production from Sibanye-Stillwater proforma Lonmin (September 2018 annuals) excluding recycling volumes – the inclusion of Lonmin information for 2018 is illustrative only as the Lonmin acquisition has not yet been completed and remains subject to a number of conditions, including Lonmin and Sibanye-Stillwater shareholder approvals and the approval of the High Court of England and Wales.

[2] Peer group information using public company filings for platinum, palladium and rhodium reflect primary production (where available) for the first half of 2018 annualised, unless full-year numbers were available while compiling these rankings.

The FTM project is on schedule and will, together with the expected eventual production build-up at Blitz, contribute to higher revenue and lower costs over the next two years.Sibanye concluded the sale of a 51% interest in the Marathon PGM/copper project, in Ontario, Canada, to Gen Mining in July 2019. In exchange, it received C$3-million in cash and 11.05-million shares in Gen Mining, giving it a 12.90% equity interest in Gen Mining, which will undertake further economic studies at the project.

Capex

Sibanye's group-wide capex increased to R7.08-billion in 2018, compared with R6.10-billion in 2017. Capex at the South African PGMs operations decreased to R1-billion, from R1.04-billion in the prior year.

A full year of capex investment at the US PGM operations had been accounted for in the financial year under review, compared with only eight months of capex having been accounted for in the prior financial year. Sibanye invested R2.83-billion in capex at the US PGM operations during 2018 (2017: R1.65-billion), with R1.57-billion (2017: R888-million) having been spent on the Blitz mine.

Sibanye invested a further R1.59-billion in capex at the US PGM operations during the six months ended June 30, 2019, compared with the R1.22-billion invested in the six months to June 30, 2018. This was mainly for growth projects at Blitz and the FTM project. The precious metals miner also invested R562.50-million at its South African PGM operations during the six months to June 30, 2019, compared with the R404.20-million invested in the prior comparable period.

Lonmin acquisition

Sibanye made an offer to acquire mine-to-market PGMs producer Lonmin in December 2017, which it said would be value-accretive for Sibanye shareholders. It also stated that the transaction was a logical step in Sibanye's PGMs strategy for Southern Africa. The transaction also, for the first time, gave Sibanye access to metals processing capabilities.

The combination of its PGM assets, with those of Lonmin, as well as Lonmin's processing facilities, is expected to unlock R730-milllion worth of operational synergies over the first three years after the merger. A further R780-million of benefits will be unlocked if Sibanye's Rustenburg operations' PGMs material is treated at Lonmin's facilities after 2021.

The South African Competition Tribunal gave its approval for the transaction in November 2018, but labour union the

Battery metals

Sibanye-Stillwater CEO Neal Froneman has started considering possible opportunities in the battery metals industry. In a July 2019 article published by online publication Miningmx, Froneman was quoted as saying that battery metals was a possible next phase of growth for Sibanye, as those were the metals that would be needed for the Fourth Industrial Revolution.

Source: Miningmx

Association of Mineworkers and Construction Union filed an appeal with the Competition Appeal Court of South Africa (CACSA) against the commission's decision in December 2018. While the commission expected merger-related job losses to reach about 3 200, the union was concerned that as many as 13 000 jobs were on the line.

This delayed the closing of the transaction. The matter was heard by the appeal court in May 2019, with the CACSA dismissing the union's appeal.

Following this, the only outstanding condition precedent to the transaction was shareholder approval. Just days ahead of the proposed shareholder vote in May 2019, newswire Bloomberg reported that some shareholders had expressed their reservations about the transaction. The article stated that the Public Investment Corporation (PIC), which at the time held 30% of Lonmin's shares, felt the transaction undervalued Lonmin and that the value of the merger with Sibanye had been eroded.

Nevertheless, by late May 2019, shareholders of Lonmin and Sibanye had given their approval for the transaction to proceed. The deal became effective on June 10, 2019, with Lonmin having been delisted from the JSE and the LSE.

A fresh legal battle was, however, launched, with newswire service African News Agency having reported in August 2019 that nonprofit organisation, the Greater Lonmin Community (GLC), which represents various communities in Rustenburg, had asked the Constitutional Court (ConCourt) to declare the merger irregular and to set aside the acquisition, claiming that the merger had been approved without the Department of Mineral Resources and Energy (DMRE) having approved a social labour plan (SLP) for the merged entity. Sibanye said at the time that it had filed court papers to oppose the GLC's application to the ConCourt. The miner argued that the GLC's application did not raise a Constitutional issue and that the SLP was unrelated to the merger or the Competition Act.

The news report pointed out that Lonmin had submitted an SLP to the DMRE in January 2018 and that a new SLP for 2019 to 2024 had since been submitted to the department but not yet approved.

Sibanye reported in September 2019 that the ConCourt had dismissed the GLC's application to have the acquisition set aside, stating that it "bore no reasonable prospects of success".

Sibanye has, meanwhile, been integrating the Lonmin operations into its own to achieve the targeted cost savings and synergies.

Meanwhile, ratings agency Standard & Poors' (S&P's) revised its outlook for Sibanye to negative in June 2019, citing uncertainty about potential impacts to the precious metals producer's liquidity. S&P's warned that Sibanye could potentially struggle if labour unions embarked on strike action during upcoming wage negotiations in the sector or if lower metal prices impacted on Sibanye's extension of a R6-billion revolving credit facility.

There is also concern about Sibanye's mounting debt, with Bloomberg having quoted Noah Capital Markets analyst René Hochreiter in May 2019 as stating that the debt overhang might be a challenge for Sibanye. The article also quoted Mergence Corporate Solutions analyst Peter Major as stating that Sibanye could face significant difficulties if there was a significant decrease in PGM prices, or if the rand strengthened considerably.

Sibanye, meanwhile, reported in August 2019 that substantial work was needed to improve below-plan production and unsustainably high operating costs at the Marikana underground operations. Sibanye initiated a review of these operations and said it expected to conclude the process during the third quarter of 2019.

Picture by Sibanye-Stillwater

Marikana mine

OTHER PLATINUM PRODUCERS

ARM PLATINUM

African Rainbow Minerals (ARM) Platinum is a division of diversified miner ARM and holds an interest in the Modikwa, Two Rivers and Nkomati joint venture (JV) mines.

It holds an effective 41.50% economic interest in the Modikwa mine, on the border between Mpumalanga and Limpopo, with the balance held by Anglo American Platinum (Amplats) and two Section 21 companies representing communities near the mine.

It owns a 55% interest in the Two Rivers platinum mine, in Mpumalanga, in which Impala Platinum (Implats) owns the balance.

ARM Platinum is also a 50:50 JV partner to Norilsk Nickel Africa in the Nkomati mine, also in Mpumalanga.

Financial and operational performance: Financial year ended June 30, 2018.

ARM Platinum increased its headline earnings for the financial year ended June 30, 2018, by 20% to R420-million, compared with the R350-million reported for the prior financial year. This was mainly owing to the Modikwa mine having posted headline earnings of R105-million, compared with a headline loss of R66-million in the prior financial year, as it benefited from a temporary change in the terms and conditions of the concentrate purchase agreement with Amplats. The revised terms and conditions will apply for three years, from January 1, 2017.

At the Two Rivers mine, however, headline earnings were lower, at R306-million, compared with the headline earnings of R325-million reported the year before, as a result of a lower head grade. The Nkomati mine's headline earnings also decreased to R9-million, from R91-million in the prior

ARM Platinum		
Group CEO Mike Schmidt/Platinum CEO Thando Mkatshana/Chairperson Dr Patrice Motsepe		
	Financial year ended June 2018	**Financial year ended June 2017**
Headline earnings/(loss)	R420-million	R350-million
PGMs production (6E)	792 583 oz	815 188 oz
	Six months ended December 2018	**Six months ended December 2017**
Headline earnings/(loss)	R167-million	R226-million
PGMs production (6E)	384 849 oz	422 104 oz

Source: Compiled from African Rainbow Minerals' Annual Integrated Report 2018 and its interim results for the six months ended December 31, 2018.
6E – platinum, palladium, rhodium, iridium, ruthenium and gold
*All production reported is on a 100% basis

year, as a result of milling low-grade stockpile material that led to lower nickel and by-product production volumes and a lower head grade.

Meanwhile, higher production at the Modikwa mine was offset by lower output at the Nkomati and Two Rivers mines, with production for the financial year ended June 30, 2018, down 3% to 792 583 oz of platinum, palladium, rhodium, iridium, ruthenium and gold (6E) platinum-group metals (PGMs). This compares with the 815 188 oz of 6E produced in the 2017 financial year.

The Modikwa mine delivered 333 888 oz of 6E (2017: 301 228 oz of 6E), ahead of the targeted 315 000 oz, but the lower head grade at the Two Rivers mine resulted in output of 348 405 oz of 6E – 11% lower than the 390 214 oz of 6E produced in the 2017 financial year and below the targeted output of 375 000 oz of 6E.

At the Nkomati mine, nickel output decreased by 16% year-on-year to 13 302 t, compared with the 15 875 t produced in the prior financial year, as a result of mining operations in the mine's Pit 3 having remained constrained owing to insufficient waste stripping, and geotechnical issues.

Capital expenditure (capex) at the ARM Platinum operations, on a 100% basis, decreased by 10% to R1.15-billion in the 2018 financial year, compared with the R1.27-billion invested in the 2017 financial year.

Financial and operational performance: Six months ended December 31, 2018

For the six months ended December 31, 2018, headline earnings decreased by 26% to R167-million, from R226-million in the six months to December 31, 2017.

The decrease was driven by the Nkomati mine having swung to a headline loss of R186-million, from headline earnings of R17-million in the prior comparable period, as a result of lower nickel and by-product sales volumes and above-inflation cost increases.

The Modikwa mine, however, increased its headline earnings to R173-million from R36-million in the prior comparable period, while the Two Rivers mine increased its headline earnings to R180-million, from R173-million in the prior comparable period.

Production at all three operations decreased during the interim period ended December 31, 2018, resulting in a 9% year-on-year decrease in output to 384 849 oz of 6E, compared with the 422 104 oz of 6E produced in the prior interim period.

Capex, meanwhile, increased to R655-million, from the R644-million spent in the prior interim period.

ATLATSA RESOURCES

TSX- and JSE-listed Atlatsa Resources is a black-owned PGMs producer. Through its subsidiary, Plateau, Atlatsa holds a 51% interest in the Bokoni mine JV, in which Amplats subsidiary Rustenburg Platinum Mines (RPM) holds the balance.

Atlatsa had placed its only operating asset, the Bokoni mine, on care and maintenance in October 2017 as part of a broader two-phased restructuring agreement entered into with RPM in July 2017. Phase 1 involved placing the mine on care and maintenance.

Atlatsa embarked on Phase 2 of the restructuring plan in December 2018, when it announced various transactions that would give effect to the restructuring, as well as its plans to operate as a private entity, which will result in its delisting from the TSX and the JSE.

As part of these transactions, Amplats subsidiary RPM acquired Atlatsa's Kwanda North and Central Block prospecting rights for R300-million in cash in August 2019. RPM will also write off the R4.60-billion in debt that Atlatsa owes it.

Atlatsa and RPM will retain their respective shareholdings in the Bokoni mine JV; however, Miningmx reported in August 2019 that Amplats was planning to sell its interest in the mine.

Further, as part of its plans to privatise the group, Atlatsa will buy back and cancel all shares held in the company by minority shareholders, offering them R1 a share.

Atlatsa shareholders voted in favour of the transactions in August 2019, while the Supreme Court of British Columbia, in Canada, also gave its approval.

Atlatsa said in August 2019 that it expected to complete the delisting from the TSX and the JSE as from September 17, 2019.

Financial and operational results: Year ended December 31, 2018

Atlatsa had treated ore from RPM's Mototolo mine under an agreement that came to an end in May 2018. As a result, Atlatsa generated revenue of $5.53-million in revenue, compared with the $116.53-million generated in the 2017 financial year.

It incurred a loss of $134.02-million for the year, compared with a loss of $314.52-million for the prior financial year.

Financial and operational results: Six months ended June 30, 2019.

Atlatsa generated no revenue in the six months to June 30, and incurred a loss of $34-million, compared with a loss of $49.61-million for the first half of 2018.

Amplats is funding all the ongoing care and maintenance costs at Bokoni, including Atlatsa's 51% of the costs through a loan account to the Bokoni mine, until December 31, 2019. Amplats has also suspended the servicing and repayment of all debt owed to it by Atlatsa until December 31, 2019.

Atlatsa expects to receive $27.80-million in proceeds from the sale of the Kwanda prospecting rights and will use those funds to settle its outstanding liabilities and fund its share of the Bokoni care and maintenance costs during 2020.

Atlatsa and RPM continue to review options for the Bokoni mine.

EASTERN PLATINUM

Canadian company Eastern Platinum (Eastplats) owns PGMs and chrome operations – the Crocodile River mine (CRM) and the Mareesburg and Kennedy's Vale projects – in South Africa.

The company, which is listed on the JSE and the TSX, is not currently producing PGMs, but its subsidiary, Barplats Mines, has started producing chrome concentrate at CRM. Barplats entered into an agreement with Union Goal Offshore Solution in March 2018 to build, mine and process the tailings resource at CRM. Union Goal is also the buyer of chrome concentrate from the Zandfontein upper group two (UG2) tailings facility.

The facility was commissioned in December 2018, with the first shipment of 10 000 t of chrome concentrate announced in February 2019.

Eastplats earned $414 000 in revenue for the financial year ended December 31, 2018, compared with no revenue the year before.

The company reported a widened net loss of $26.27-million for the financial year, compared with the net loss of $9.21-million in the 2017 financial year.

From December 2018 to April 30, 2019, the facility produced 144 419 t of chrome concentrate. Once at full operation, which had been expected to occur in July 2019, the facility is expected to generate cash flow of about $1-million a month for five years.

Eastplats earned $15.84-million in revenue for the six months ended June 30, 2019, compared with no revenue in the first half of 2018. Its net loss for the period decreased to $873 000, from the net loss of $5.41-million in the prior comparable period.

Further, in April 2019, Eastplats started testing a PGM recovery circuit for the tailings resource at CRM to generate additional revenue. It expects to make a decision in this regard during the third quarter of the year.

At the Mareesburg project, SRK Consulting had conducted a feasibility study, which had been set for completion in the second quarter of 2019. The results of the study have yet to be released.

Eastplats shareholder to appeal directive action ruling

The shareholder whose petition to start a directive action against current and former directors of junior miner Eastern Platinum (Eastplats), which was dismissed in court in August 2019, was given notice of an appeal in September 2019.

Eastplats said that it would oppose the appeal and would seek to uphold the Supreme Court of British Columbia's earlier decision of a dismissal.

The derivative action, which is usually brought by a shareholder on behalf of a company against directors, was sought by 2538520 Ontario Limited.

The judge dismissed the appeal with costs in August 2019, but allowed a limited period in which an appeal might be lodged. The derivative action pertained to 2018 transactions between Eastplats and Union Goal Offshore Solutions. The agreement provided for the construction, mining and processing of the tailings resource, and the subsequent offtake of chrome concentrate, from the Barplats Zandfontein upper group two tailings facility, located at the Crocodile River Mine, in South Africa.

Under the agreement, Union Goal financed and supplied Barplats with the chrome processing circuit, related technology and know-how, while Barplats developed the retreatment project and is now mining and operating it too.

Operations at the retreatment project began in December 2018. Full capacity was anticipated in the third quarter of 2019.

Source: *Mining Weekly*

JUBILEE METALS

Jubilee Metals, which is listed on the JSE's AltX and the LSE's Aim, recovers metals from surface material previously regarded as waste or discard. Its portfolio of operations includes the Hernic platinum project, the Dilokong Chrome Mine (DCM) platinum and chrome project, the PlatCro platinum project and the Tjate platinum project.

The Hernic project, which has access to about three-million tonnes of surface material containing an estimated 224 000 oz of platinum, palladium, rhodium and gold (4E), is designed to process more than 600 000 t/y of tailings.

During the financial year ended June 30, 2018, the project delivered 17 354 oz of PGMs. It produced a further 12 288 oz of PGMs in the six months to December 31, 2018, nearly double the 6 629 oz produced in the six months ended December 31, 2017.

Further, under Jubilee's agreement with DCM, it has access to more than 850 000 t of surface material containing an estimated 74 000 oz of 4E. Jubilee currently produces chrome at the DCM project. During the six months ended December 31, 2018, Jubilee commissioned the industry's first fine chrome recovery circuit at the mine. The 25 000 t a month fine chrome plant started producing in January 2019.

Jubilee also completed the acquisition of the PlatCro chrome processing facility, near several chrome mining operations, where there is a need for an efficient chrome processor, in January 2019.

It also holds the rights to PlatCro's 1.90-million tonnes of platinum-bearing surface material. After removing the chrome from the material, it transports the material, at 60 000 t a month, to Northam Platinum's nearby Eland Platinum operation for further refining. Eland is expected to recover about 2 800 oz a month of PGMs and the earnings will be shared between Jubilee and Eland.

Jubilee reported in May 2019 that Eland had started commissioning the platinum recovery plant and the first PlatCro PGMs material was treated at the plant in June 2019. This adds 30 000 oz/y of PGMs production capacity to the 30 000 oz/y production capacity at the Hernic project, taking Jubilee's overall PGMs production capacity to 60 000 oz/y.

Jubilee is also developing the Tjate platinum mining project, which will be a medium-sized underground mine that will extract Merensky and UG2 reefs containing PGMs, chromite and other associated metal ore.

As part of its metals recovery strategy, Jubilee completed the acquisition of the Sable Zinc Kabwe refinery, in Zambia, from subsidiaries of diversified miner Glencore in July 2019. The acquisition is expected to yield production of lead, zinc and vanadium.

Jubilee earned £4.14-million in revenue for the financial year ended June 30, 2018, up 44.14% on the £9.81-million in revenue earned in the 2017 financial year. The company achieved an operating profit of £60 000, compared with a loss of £18.57-million in the prior financial year.

For the six months to December 31, 2018, Jubilee reported a 39% year-on-year increase in revenue to £8.33-million, compared with the revenue of £5.99-million earned in the six months to December 31, 2017. The profit for the period increased by 274% to £760 000, compared with a loss of £440 000 in the prior comparable period.

In September 2019, Jubilee announced that its JV Windsor PGMs project had successfully been commissioned and was fully operational. The project produced 1 346 oz of PGMs in August 2019 – its first operational month. The project comprises a surface processing plant that processes historical waste dumps to recover PGMs at low cost. It forms part of Jubilee's wider project area in the Western Bushveld Complex. The plant is expected to process about 60 000 t a month of feed material to produce about 2 500 oz of PGMs a month.

NORTHAM PLATINUM

Northam Platinum is a midtier integrated PGMs producer and owns the Booysendal, Zondereinde and Eland mines. The Booysendal UG2 North mine is located near Lydenburg, on the eastern limb of the Bushveld Complex. Northam is also expanding its Booysendal operations to include the Booysendal Merensky North and Booysendal South mines.

Northam mines UG2 and Merensky reef ore at its Zondereinde mine on the northern limb of the Bushveld Complex. The mine produces about 300 000 oz/y of 4E.

The PGMs producer acquired the Eland mine, on the western limb of the Bushveld Complex, from Glencore Operations South Africa for R175-million in February 2017. The mine has been on care and maintenance since 2015, while Northam has been completing a feasibility study on the Kukama shaft, which will resume mining operations during the 2020 financial year.

Northam announced in June 2019 that it had started early work in preparation for recommissioning the shaft. The Kukama decline

Northam Platinum		
CEO Paul Dunne/Chairperson Brian Mosehla		
	Financial year ended June 2019	**Financial year ended June 2018**
Headline earnings/(loss)	R55.32-million	(R701.61-million)
Normalised headline earnings/(loss)[1]	R1.38-billion	R421.47-billion
Refined platinum	350 837 oz	289 962 oz
Refined PGMs production (6E)[2]	657 975 oz	549 500 oz
	Six months ended December 2018	**Six months ended December 2017**
Headline earnings/(loss)	(R66.64-million)	(R279.83-million)
Normalised headline earnings/(loss)[1]	R553.31-million	R189.12-million
Refined platinum	181 036 oz	126 461 oz
Refined PGMs production (6E)[2]	334 962 oz	249 865 oz

Source: Compiled from Northam Platinum Integrated Annual Report 2019 and interim results for the six months ended December 31, 2018

[1]Northam uses normalised headline earnings as its main measure of performance. It is calculated using the headline loss, adjusted for noncash items relating to the company's 2015 black economic-empowerment transaction.

[2]6E – platinum, palladium, rhodium, ruthenium, iridium and gold.

shaft will be converted into a footwall array during the 2020 financial year, with strike development and stoping build-up scheduled to start in the 2021 financial year.

The shaft is expected to build up to producing 100 000 oz of 4E by 2025 and will then ramp up to steady-state production of 150 000 oz/y of 4E by 2029. The shaft has an estimated life-of-mine of more than 30 years.

Northam will spend R2.20-billion over a five-year period to develop the operation, which is expected to create 2 800 permanent jobs.

Financial and operational performance: Six months ended December 31, 2018

Northam reported a headline loss of R66.64-million, compared with the headline loss of R179.83-million incurred in the six months to December 31, 2017. Normalised headline earnings increased to R553.31-million, compared with R189.12-million in the prior comparable period. Northam produced 334 962 oz of 6E for the interim period, compared with the 249 865 oz produced in the prior comparable period.

Meanwhile, the PGMs producer has secured R2.65-billion in additional funding. It announced in April 2019 that it had completed a private placement of domestic medium-term notes valued at R1.65-billion. The proceeds were used to settle notes in issue, valued at R1.25-billion, that matured during April, May and June 2019.

In May 2019, Northam announced that it had increased its existing revolving credit facilities by R500-million to R3.50-billion and secured a new R500-million general banking facility.

Financial and operational performance: Financial year ended June 30, 2019

Northam swung to headline earnings of R55.32-million in the year ended June 30, 2019, from the headline loss of R701.61-million incurred in the 2018 financial year. Its normalised headline earnings, which strips out noncash items pertaining to the company’s 2015 black economic-empowerment (BEE) transaction, increased to R1.38-billion, from R421.47-million in the prior financial year.

The company's equivalent refined PGMs output increased to 657 075 oz of 6E, up 19.70% on the 549 500 oz of 6E produced

Picture by Northam

Zondereinde mine smelter

in the prior financial year. Its refined platinum production increased by 21% year-on-year to 350 837 oz, compared with the 289 962 oz produced in the prior financial year.

After record capex investment of R3.78-billion in the 2018 financial year, Northam invested a further R2.90-billion in the 2019 financial year.

At the Zondereinde mine, stoping has started in the Western extension, while the deepening project continues.

Northam also continues to progress its Booysendal South project, as well as the Central UG2 complex, where underground reserve build-up is on track.

The company expects to invest R2.30-billion in capex in the 2020 financial year, with R595-million to be spent at Zondereinde, R1-billion at Booysendal South and R400-million at the Eland mine.

Meanwhile, the company reported in August 2019 that it had acquired 13.70-million Zambezi preference shares from the Public Investment Corporation for R1.01-billion in cash. Following the transaction, it held 19.41-million Zambezi preference shares, representing about 12.10% of all shares in issue. Northam explained that the transaction would reduce the preference share dividend expense and liability included in the company’s financial statements.

In early September 2019, Northam announced that it would buy a further 3.98-million Zambezi preference shares from Coronation Asset Management for about R292.60-million in cash. It said that, when the transaction closed at the end of September, it would hold about 14.60% of all Zambezi preference shares in issue.

Northam had, in 2015, as part of a BEE transaction, sold 31.40% of Northam’s shares to Zambezi Platinum.

ROYAL BAFOKENG PLATINUM

Royal Bafokeng Platinum (RBPlat) is a midtier PGMs producer, with operations located on the western limb of the Bushveld Complex. Its Bafokeng Rasimone Platinum Mine (BRPM) produces about 180 000 oz/y of platinum in concentrate, while its Styldrift mine is a mechanised underground mine, located about 5 km from BRPM's North shaft.

RBPlat also owns the BRPM and Maseve concentrator plants.

For the 2018 financial year, ended December 31, 2018, RBPlat recorded earnings before interest, taxes, depreciation and amortisation (Ebitda) of R504.10-million, an 11.90% decrease on the Ebitda of R572.20-million achieved in the 2017 financial year.

From an operational point of view, the company was more successful, having successfully completed the acquisition of the Maseve concentrator plant and Anglo American Platinum's 33% interest in BRPM.

The Department of Mineral Resources and Energy also granted a Section 11 in July 2019 approving the transfer of the 33% interest in BRPM to RBPlat.

Further, the Styldrift mine reached commercial production of 150 000 t a month in October 2018.

RBPlat's platinum metal-in-concentrate output increased by 12.70% year-on-year to 239 000 oz, from 212 000 oz the

Royal Bafokeng Platinum		
CEO Steve Phiri/Chairperson Kgomotso Moroka		
	Financial year ended December 2018	**Financial year ended December 2017**
Ebitda[1]	R504.10-million	R572.20-million
Platinum metal in concentrate	239 000 oz	212 000 oz
PGMs in concentrate (4E)[2]	368 000 oz	328 000 oz
	Six months ended June 2019	**Six months ended June 2018**
Ebitda[1]	R525.60-million	R222.50-million
Platinum metal in concentrate	129 200 oz	106 500 oz
PGMs in concentrate (4E)[2]	199 200 oz	164 500 oz

Source: Integrated Annual Report 2018 and interim results for the six months ended June 30, 2019
[1]Ebitda – earnings before interest, taxes, depreciation and amortisation
[2]4E – platinum, palladium, rhodium and gold

year before, while its 4E PGMs metal-in-concentrate output increased to 368 000 oz, from 328 000 oz in the prior financial year.

The PGMs producer will increase the capacity of the Styldrift mine to 230 000 t a month by the third quarter of 2020 and is investing in the expansion of the mine. Its capex for the 2018 financial year increased by 60.10% year-on-year to R3.46-billion (2017: R2.01-billion).

The Styldrift mine had been intended to start commercial production of 150 000 t a month during the first half of 2018, but delays to the Silo No 4 rehabilitation delayed the overall project, resulting in the capex needed to reach the 150 000-t-a-month target having increased to R11.80-billion from the originally expected R10.80-billion.

In March 2019, the company announced plans to undertake a R1-billion rights offer to help fund upgrades to the newly acquired Maseve concentrator plant and the expansion of the Styldrift mine to the targeted 230 000 t a month.

In April 2019, it announced the successful completion of the rights offer, which raised R1.03-billion.

For the six months ended June 30, 2019, RBPlat's Ebitda increased to R525.60-million, a 136.20% improvement on the Ebitda of R222.50-million reported for the six months ended June 30, 2018.

Platinum-in-concentrate production for the six months increased by 21.30% year-on-year to 129 200 oz, compared with the 106 500 oz produced in the first half of the 2018 financial year, while 4E PGMs metal-in-concentrate production increased by 21.10% year-on-year to 199 200 oz, compared with the 164 500 oz produced in the prior comparable period.

Capex for the six-month period decreased by 55% year-on-year to R621-million, compared with the R1.38-billion spent in the prior comparable period, mainly as a result of Styldrift having reached commercial operation.

SEDIBELO PLATINUM MINES

Unlisted Sedibelo Platinum Mines owns Pilanesberg Platinum Mines (PPM), which comprises the West Pit operation, the East Pit, a PGMs concentrator and mineral rights holdings on the western and eastern limbs of the Bushveld Complex.

During the financial year ended December 31, 2018, PPM's production increased to 150 375 oz of 4E, compared with the 132 691 oz of 4E produced in the 2017 financial year.

Ebitda improved to $6.80-million for the financial year, compared with a $15.91-million loss before interest, taxes, depreciation and amortisation in the 2017 financial year.

SYLVANIA PLATINUM

Aim-listed Sylvania Platinum produces platinum, palladium and rhodium through the retreatment of PGMs-rich chrome tailings material. It owns and operates six complexes, which, together, are known as the Sylvania Dump Operations (SDO). The Millsell, Mooinooi run-of-mine (RoM) and Lesedi plants, as well as the Mooinooi Dump operation, are located on the western limb of the Bushveld Complex. The Doornbosch, Lannex and Tweefontein plants are located on the eastern limb of the Bushveld Complex.

The SDO produced 72 090 oz of 4E in the financial year ended June 30, 2019. This was slightly higher than the 71 026 oz of 4E produced in the 2018 financial year and was the sixth consecutive year of record production.

The higher output was the result of a 3% year-on-year increase in PGM plant recoveries, which was, in turn, driven by the contribution of material from the secondary milling and flotation (MF2) plants at Millsell and Doornbosch for the full year, compared with only six months in the prior financial year, as well as process improvements at Tweefontein.

Sylvania reported in September 2019 that utility infrastructure and power supply constraints had contributed to challenges

Sylvania Platinum		
CEO Terence McConnachie/Chairperson Stuart Murray		
	Financial year ended June 2019	**Financial year ended June 2018**
Net profit/(loss)	$18.20-million	$10.99-million
PGM production (4E)[1]	72 090 oz	71 026 oz

Source: Compiled from Sylvania Platinum's Annual Report 2019.
[1]4E – platinum, palladium, rhodium and gold

Tharisa		
CEO Phoevos Pouroulis/Chairperson Loucas Pouroulis		
	Financial year ended September 2018	**Financial year ended September 2017**
Net profit/(loss)	$51-million	$67.70-million
PGMs production (5PGE + Au)[1]	152 200 oz	143 600 oz
	Six months ended March 2019	**Six months ended March 2018**
Net profit/(loss)	$8.20-million	$28.40-million
PGMs production (5PGE + Au)[1]	67 600 oz	77 000 oz

Source: Compiled from Tharisa's Integrated Annual Report 2018 and consolidated financial statements for the six months ended March 31, 2019.
[1]5PGE + Au – platinum, palladium, rhodium, ruthenium, iridium and gold.

being experienced at the operations, as well as in the execution of expansion projects, throughout the year.

The implementation of the Tweefontein MF2 module, in particular, had been delayed as a result of the power supply constraints and, while the module is the next in line to be implemented, this will be dependent on an upgrade by State-owned power utility Eskom of the energy infrastructure needed to ensure stable and reliable power supply to the host mine and Sylvania's Tweefontein operation.

By September 2019, the upgrade was under way, with Sylvania stating that Eskom was expected to commission the required infrastructure during the 2020 financial year.

Drought conditions had also negatively impacted on the Lesedi plant. To alleviate the impact of the drought conditions, boreholes were drilled and a water transfer scheme from neighbouring operations implemented. Additional boreholes will be drilled, while Sylvania explores different process options to reduce water consumption.

Meanwhile, Sylvania's revenue increased by 12% year-on-year to $70.50-million (2018 financial year: $62.80-million), as a result of a 13% year-on-year increase in the average gross basket price for PGMs to $1 277/oz (2018 financial year: $1 135/oz).

Net profit increased by 66% year-on-year to $18.20-million (2018 financial year: $10.99-million).

THARISA

JSE-listed Tharisa is an integrated resources group that is headquartered in Europe. It holds a 74% interest in Tharisa Minerals, which operates the Tharisa openpit mine on the south-western limb of the Bushveld Complex. Tharisa Minerals also owns the Genesis and Voyager processing plants that have a combined design capacity of 4.80-million tonnes a year of RoM ore.

For the financial year ended September 30, 2018, PGMs production increased by 6% to 152 500 oz of platinum, palladium, rhodium, ruthenium, iridium and gold (5PGE + Au), compared with the 143 600 oz of 5PGE + Au produced in the 2017 financial year.

For the six months ended March 31, 2019, PGMs output decreased by 12% to 67 600 oz, compared with the 77 000 oz produced in the prior interim period. A pit redesign and load-shedding negatively impacted on production for the six-month period.

Tharisa is targeting production of 200 000 oz of PGMs and two-million tonnes of chrome in 2020.

Meanwhile, its Karo Mining Holdings subsidiary, in which it holds a 26.80% interest, is planning to develop an integrated PGMs mining and refining complex in Zimbabwe. Exploration is under way.

Picture by Tharisa

Drilling at the Tharisa mine

EXPLORATION AND DEVELOPMENT COMPANIES

JSE-listed **Bauba Resources**, formerly called Bauba Platinum, operates the Moeijelijk chrome mine, in Limpopo, and owns the Bauba platinum project, where exploration remains suspended.

During the financial year ended June 30, 2018, the company focused on developing an underground operation at Moeijelijk to complement the existing opencast operation.

Further, the company commissioned a new spiral wash plant at Moeijelijk in November 2018, which enables it to process run-of-mine chrome ore into foundry, chemical and metallurgical-grade concentrates.

The premium-grade speciality chrome ore concentrate is expected to lead to an improvement in the company's future profit margins.

Bauba reported in March 2019 that the wash plant had reached its targeted throughput of 35 000 t a month as from January 2019.

In May 2019, the company also entered into an agreement with Northam Platinum subsidiary Booysendal Platinum for the processing of 24 000 t of low-grade chrome ore recovered from the Moeijelijk mine at Booysendal's concentrator plant over a six-month period.

Bauba CEO Nick van der Hoven stated that the agreement would add an additional revenue stream for the Moeijelijk mine.

The company also announced in May 2019 that it would change its name to better reflect the diversified nature of the company.

Meanwhile, exploration at its Bauba platinum project, which comprises prospecting rights over eight properties spanning more than 14 000 ha, in Limpopo, remains suspended amid low platinum group element prices.

Ivanplats, which owns the Platreef platinum group metals (PGMs), nickel, copper and gold mine, in South Africa's Limpopo province, is 64%-owned by Canadian exploration company Ivanhoe Mines. A Japanese consortium comprising Itochu Corporation; Japan Oil, Gas and Metals National Corporation (Jogmec); and Japan Gas Corporation, holds a further 10% interest in Ivanplats, while the balance is owned by broad-based black economic-empowerment (BEE) partners, including 20 local host communities, project employees and local entrepreneurs.

Ivanplats' focus at the Platreef project remains on the development of the Flatreef deposit, which is said to be amenable to mechanised underground mining.

The Platreef mine will be developed in phases, starting with a four-million-tonne-a-year operation. The mine will then be expanded to an eight-million-tonne-a-year operation and finally to a 12-million-tonne-a-year operation, at which point it will be among the biggest PGM mines in the world.

Picture by Ivanplats

Platreef mine

By the third quarter of 2018, Shaft 1 had reached the top of the high-grade Flatreef deposit at 780.20 m below surface and, by May 2019, it had reached 855 m below surface. It is expected to reach its final depth of 982 m by early 2020. The 750 m and 850 m level stations will provide initial underground access to the high-grade orebody, with a final station to be developed at 950 m below surface.

Shaft 2, which is being developed about 100 m from Shaft 1 and will become the main mining shaft, will be sunk to deeper than 1 104 m below surface. It will be equipped with two 40 t rock-hoisting skips capable of hoisting six-million tonnes a year of ore.

Ivanhoe reported in May 2019 that the excavation of the boxcut at Shaft 2 and construction of the hitch foundation would be completed during June 2019, paving the way for the start of presinking work.

The company is, meanwhile, considering accelerating first production using Shaft 1 – which will be the mine’s main ventilation shaft – as the mine's initial production shaft. If the company implements this option, it will develop mining zones accessible from Shaft 1 while increasing the hoisting capacity of the shaft. This is expected to result in lower initial capital expenditure.

Emerging platinum miner **Nkwe Platinum**, which owns the Garatau platinum project, in Limpopo, was bought out by Chinese firm Zijin Mining Group in March 2019. Zijin had been the majority shareholder in Nkwe when it made a A$90-million offer to acquire then ASX-listed Nkwe in early 2018. Nkwe's shares have since been delisted from the ASX.

Meanwhile, newspaper, The West Australian, reported in April 2019 that some minority shareholders who had sought to prevent Zijin from voting during a shareholders meeting to decide on the buyout by the Chinese firm, were incensed at not having been paid for their shares.

The news article explains that, under Australian corporate law, Zijin, which held a 61% interest in Nkwe before proposing the buyout, should not have been allowed to vote on the transaction; however, Nkwe was incorporated in Bermuda, meaning that Australian corporate law did not apply to it.

According to the news article, the minority shareholders wanted to prevent the transaction from proceeding, as they felt Nkwe's shares were worth more than the A$0.10 a share offered by Zijin.

These shareholders have reportedly appealed to the courts in Bermuda to determine a fair value for Nkwe's shares, while Zijin has decided to withhold payment for those minority-held shares until the appeal has been finalised, which may take up to 18 months to conclude.

TSX- and NYSE American-listed **Platinum Group Metals** (PTM) is a Canada-headquartered company and is developing the palladium-dominant Waterberg project, in South Africa's Limpopo province, in a joint venture with Implats, Jogmec, Japanese trading company Hanwa and BEE partner Mnombo Wethu Consultants. PTM holds a 50.02% effective interest in the project.

Hanwa had, in March 2019, acquired a 9.76% interest in the Waterberg project from Jogmec, which had put the stake up for sale through a tender process.

A definitive feasibility study (DFS) is under way at the Waterberg project and is considering two options – a 600 000-t-a-month operation and a smaller 250 000-t- to 300 000-t-a-month operation.

PTM reported in April 2019 that optimisation work undertaken as part of the DFS had determined that higher extraction rates for mineralised material would be achievable if tailings and concrete were used as backfill in mined-out stopes to allow for the extraction of mineralised material that would otherwise be left as support pillars. PTM expects this will positively impact on tonnes and ounces while reducing the mine's tailings footprint.

The JV partners have also agreed to include only two twin decline systems in the DFS design, instead of the previously planned three decline systems.

The partners, which have submitted a formal mining right application for the Waterberg project, expect the DFS to be completed in August 2019 and have increased the budget for the DFS to R21.50-million.

PTM raised $1.30-million through a private placement with Hosken Consolidated in June 2019. The funds will be used to cover PTM's share of the remaining costs to complete the DFS.

In July 2019, PTM announced that it would submit the DFS to engineering firm SRK Consulting for a peer review before publishing it by the end of the third quarter of 2019. The company added that it had started detailed infrastructure planning for the project.

Hydrological work had identified sufficient groundwater resources for the project and the surrounding communities.

PTM was also making progress in getting the project area connected to the national electricity grid.

Meanwhile, the company also entered into various agreements in August 2019 to raise funds to repay a loan facility to Liberty Metals and Mining (LMM), which the company said would reduce and defer its secure debt while it continues to develop the Waterberg project.

As part of the agreements signed, it raised $10.40-million through the issue of 8.30-million PTM shares to BMO Capital Markets. It also entered into a $20-million credit agreement with Sprott Private Resource Lending II, a subscription agreement with Deepkloof to raise $9.10-million, and a payout and subscription agreement with LMM to raise $10-million.

JSE-listed **Wesizwe Platinum**, which is 45%-owned by a consortium between the Jinchuan Group and the China Africa Development Fund, is developing the Bakubung platinum mine, near Rustenburg, in the North West. Mine development started at Bakubung in July 2011. Wesizwe announced in March 2019 that it would implement a new mine plan at Bakubung.

As a result of lower PGMs demand, Wesizwe was struggling to raise the funding required to develop a three-million-tonne-a-year operation and, therefore, decided to scale back development to a one-million-tonne-a-year mine capacity, along with a one-million-tonne-a-year processing plant.

The company plans to operate the scaled back operation between 2021 and 2026 and will consider whether it should proceed with an expanded two-million-tonne-a-year operation thereafter. That decision will depend on market conditions.

OUTLOOK

The South African platinum group metals (PGMs) sector remains under pressure, with much of the industry's operations either lossmaking or marginal. The current market environment does not bode well for an immediate turnaround in the industry, which has already made significant efforts to rightsize operations through restructurings, consolidations or shaft closures.

In the short term, South Africa's State-owned utility Eskom's facing electricity supply challenges is likely to have a significant impact on the mining sector, while electricity tariffs are rising. Simultaneously, the country's biggest miners are starting talks with labour unions about wage increases for employees. While the mining companies say they understand that their employees are facing the financial burdens of increased living costs, the mines must also ensure their sustainability and viability.

A five-month strike at Sibanye-Stillwater's gold operations that started in November 2018 and briefly spilled over into not only Sibanye's but also the rest of the PGMs miners' operations in early 2019, means there is some concern that the PGMs industry could face a protracted strike, such as the one experienced during 2014. It remains to be seen if this will be the case.

The Association of Mineworkers and Construction Union has indicated its massive wage increase demands, which will have a significant impact on miners' profitability if achieved.

To boost the fortunes of the industry, its employees and the country, Minerals Council South Africa has made proposals as to how the country can promote platinum to the global market in the long term, thereby not only halting the current decline in the domestic platinum industry but also growing the industry and increasing direct and indirect employment.

Through investments to improve domestic mines' productivity and output, and increasing investment, jewellery and industrial demand for PGMs, the council is optimistic that the PGMs industry in South Africa has a bright future, which will also contribute significantly to the country's future economic growth and tax earnings.

Picture by ARM Platinum

The current market environment does not bode well for an immediate turnaround in South Africa's platinum industry

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PLATINUM 2019

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