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A review of South Africa's platinum sector

Platinum ore

Picture by Duane Daws

The material contained in this report was compiled by Chanel de Bruyn and the Research Unit of Creamer Media (Pty) Ltd, based in Johannesburg.

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Cover picture by Duane Daws

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List of abbreviations and acronyms

AGET	Africa Green Energy Technologies
AMCU	Association of Mineworkers and Construction Union
Amplats	Anglo American Platinum
AMV	African Mining Vision
BRPM	Bafokeng Rasimone Platinum Mine
BTT	bulk tailings treatment
capex	capital expenditure
CoM	Chamber of Mines
CFIUS	Committee on Foreign Investment in the US
DMR	Department of Mineral Resources
ETF	exchange-traded fund
HySA	Hydrogen South Africa
Implats	Impala Platinum
IPM	Isondo Precious Metals
JV	joint venture
MEA	membrane electrode assemblies
MF1	single-stage milling and flotation
MF2	secondary milling and flotation
MHSA	Mine Health and Safety Act
MPRDA	Mineral and Petroleum Resources Development Act
NUM	National Union of Mineworkers
PEM	proton exchange membrane
PFS	prefeasibility study
PGE	platinum-group element
PGMs	platinum-group metals
RBPlat	Royal Bafokeng Platinum
RPM	Rustenburg Platinum Mine
SDO	Sylvania Dump Operations
SIB	stay-in-business
SMC	Stillwater Mining Company
SPM	Sedibelo Platinum Mines
UG2	upper group two

Platinum core samples

Picture by Duane Daws

Units of measurement

The distinction between tonne (1 000 kg) and ton (1 016.047 kg) is maintained in this report according to the information that is reported in the public domain by each company.

Key developments

June 2016: Northam's board of directors approves the development of the R4.20 billion Booysendal South project, which straddles the border of Limpopo and Mpumalanga.
June 2016: Atlatsa Resources and Anglo American Platinum complete the restructure of the joint venture Bokoni mine, in Limpopo.
July 2016: Aveng Mining starts sinking work on Shaft 1 at Ivanhoe Mines' Platreef project, in Limpopo.
July 2016: A dissident shareholder, Ka An Development, succeeds in having Eastern Platinum's (Eastplats') board members removed and replaced with six nominees of its choosing. The new board immediately starts a review of a $50 million deal entered into by the former board to sell Eastplats' Barplats subsidiary to a Chinese company.
July 2016: Wage negotiations between platinum miners and unions get under way amid fears of a repeat of the protracted strike in 2012, during which more than 30 people were killed.
August 2016: Sylvania Platinum announces its Project ECHO, which is aimed at improving platinum group metal recovery efficiencies at the Sylvania Dump Operations and prolonging the life of these plants.
September 2016: Wesizwe Platinum and Bakubung Platinum Mine shaft sinking contractor Aveng Mining agree to the early termination of Aveng's contract.
October 2016: Wesizwe Platinum says it plans to appoint two contract mining companies to operate its Bakubung mine, in the North West, for the first five years.
November 2016: Ivanhoe Mines announces that Murray & Roberts Cementation has completed the design for the development of Shaft 2 at its Platreef project, in Limpopo.
November 2016: Unions and platinum miners reach a three-year wage deal, with agreed increases of between 7% and 12.5%.
November 2016: The sale of Anglo American Platinum's Rustenburg Operations to Sibanye Resources is finalised.
November 2016: The Chamber of Mines considers restarting legal proceedings against the Department of Mineral Resources (DMR), saying it has not been consulted on the much delayed revised mining charter. The DMR, however, says it has consulted widely on the changes.
November 2016: Platinum Group Metals highlights the negative impact of Section 54 safety stoppages on the ramp-up of production at its Maseve mine, in the North West.
December 2016: Impala Platinum announces Nico Muller will succeed Terence Goodlace as CEO.
December 2016: Sibanye announces it has entered into an agreement to buy US platinum miner Stillwater Mining Company for about R30-billion.
January 2017: Bauba Platinum restarts chrome mining operations at its Moeijelijk mine, in Limpopo, after a recovery in chrome prices.
February 2017: Jubilee Platinum produces the first chromite at its Hernic tailings project, in the North West.
February 2017: Wesizwe Platinum appoints Zhimin Li CEO after the resignation of Jianke Gao.
February 2017: Anglo American Platinum announces it will sell its 85% interest in the Union mine, as well as its 50.1% interest in Masa Chrome Company to privately owned Siyanda Resources, while still mulling its options for the sale of its 49% interest in the Bokoni joint venture, in Limpopo.
February 2017: Sibanye announces the South African Reserve Bank has approved its R30-billion buyout of US platinum group metals miner Stillwater Mining Company.
February 2017: Glencore sells its Eland mine to Northam Platinum for R175-million.

Key developments *(continued)*

April 2017: The Committee on Foreign Investment into the US approves Sibanye's proposed acquisition of Stillwater.

April 2017: Shareholders of Sibanye and Stillwater, respectively, vote in favour of Sibanye's buyout of Stillwater.

April 2017: British Virgin Islands company AlphaGlobal Capital applies to the High Court in Pretoria for the winding up of Eastern Platinum, claiming Eastplats is unable to pay its debt. In March, Eastplats announced it was opposing a claim by AlphaGlobal for damages over a 2007 agreement under which Eastplats acquired a further 5% interest in Barplats Investments.

April 2017: Eastern Platinum announces it has missed the deadline to file its financial statements for the year ended December 31, 2016, as investigations continue into transactions entered into by the company's former management.

May 2017: Sibanye successfully concludes the acquisition of Stillwater.

Mogalakwena mine

Picture by Amplats

Global industry overview

Ongoing platinum price weakness is a significant concern for platinum miners, with some of the largest producers cutting back on investment in new capacity. The world's largest producer Anglo American Platinum noted in its annual report for 2016 that the average price for platinum reached $989/oz in 2016, a 6% drop on the average price of $1 053/oz achieved in 2015. It pointed out that a stronger dollar and interest rate increases in the US had contributed to lower platinum prices in the second half of the year.

Global mine supply remains constrained, with South African producers facing the challenges of not only a low-price environment but also rising costs, regulatory uncertainties and safety stoppages.

On the demand side, investment demand has been strong, as has industrial demand, while jewellery demand has taken a knock, owing to lower demand for platinum jewellery in China, which is a significant market. Contrary to expectations, demand for platinum from the automotive industry increased by 1% in 2016, despite fears of the potential impact of the Volkswagen diesel scandal on demand for diesel vehicles.

It emerged in late 2015 that Volkswagen had installed devices on some of its diesel vehicles in the US to lower the apparent emissions from those vehicles to meet US standards. After this came to light, many organisations expected global demand for diesel vehicles to drop. However, the World Platinum Investment Council (WPIC), noted in March 2017 that diesel vehicles remained an attractive option for reducing carbon dioxide emissions.

Supply and demand

Platinum supply comes primarily from mining output, which contributed about 72% to 78% of yearly platinum supply between 2011 and 2016, and the recycling of autocatalysts and jewellery, which is considered secondary supply.

According to data released by the WPIC, total platinum supply increased to 7.92-million ounces in 2016, compared with 7.91-million ounces in 2015, as higher secondary supply offset lower mining output.

Secondary supply increased by 9% year-on-year to 1.87-million ounces, owing to a 21% year-on-year increase in jewellery recycling to 625 000 oz (2015: 515 000 oz), mainly as a result of higher volumes in China, and a 4% year-on-year increase in the recycling of spent autocatalysts to 1.24-million ounces. The increased recycling of autocatalysts was attributed to improved scrap steel prices, the WPIC reported in March 2017.

Mine supply, meanwhile, decreased to 6.06-million ounces from 6.20-million, as a result of statutory safety stoppages at South African mines, price-induced restructuring of operations on the western limb of the Bushveld Complex and other operational challenges that contributed to lower underground ore volumes being hoisted.

Platinum supply and demand balance

	2015	2016	2017f
Supply	('000 oz)		
Refined production	**6 150**	**6 025**	**5 960**
South Africa	4 465	4 245	4 200
Zimbabwe	405	490	440
North America	385	395	405
Russia	715	715	735
Other	180	180	180
Producer inventory increase (–) /decrease (+)	+45	+30	+10
Total mine supply	**6 195**	**6 055**	**5 970**
Recycling	**1 710**	**1 865**	**1 760**
Autocatalyst	1 190	1 235	1 255
Jewellery	515	625	500
Industrial	5	5	5
Total supply	**7 905**	**7 920**	**7 730**
Demand			
Automotive	3 390	3 435	3 405
Jewellery	2 880	2 565	2 530
Industrial	1 670	1 775	1 610
Investment	305	505	250
Total demand	**8 245**	**8 280**	**7 795**
Balance	**–340**	**–360**	**–65**
Above-ground stocks	2 340	1 950	1 885

Source: SFA Oxford and World Platinum Investment Council (May 2017)
f – forecast

Platinum group metals management services firm Johnson Matthey has pointed out that, following the five-month strike by workers in South Africa's platinum sector in 2014, South African platinum producers had, over 2014/15, drawn heavily on their refined pipeline inventories, with the available inventories now largely depleted.

Meanwhile, mine supply from Zimbabwe and North America increased, owing to improved output at a new mine in Zimbabwe, as well as improved productivity at one mine and the normalisation of supply at another mine in North America.

The lower mine supply contributed to a 2% year-on-year decrease in refined platinum production to 6.03-million ounces in 2016 (2015: 6.15-million ounces).

The automotive, industrial, jewellery and investment sectors are the four core areas of platinum demand. Global demand increased to 8.28-million ounces in 2016 (2015: 8.24-million ounces), driven by higher demand in the automotive, industrial and investment sectors, but offset by slowing demand from the jewellery sector.

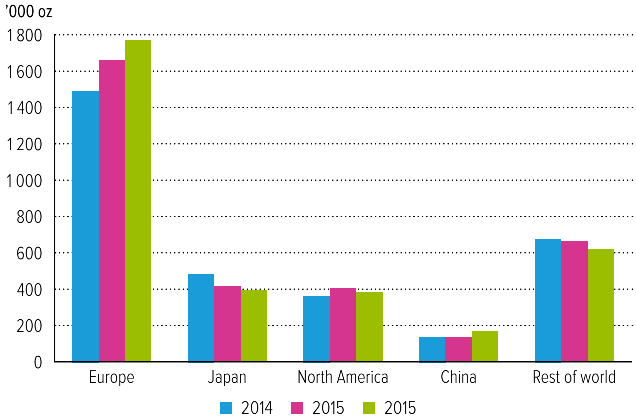
Data published by the WPIC shows that platinum demand in the automotive industry increased to 3.44-million ounces in 2016 (2015: 3.39-million ounces) as car sales in the European Union rose. The demand for platinum in autocatalyst loadings increased as European countries worked to meet tighter Euro 6 fuel standards.

Johnson Matthey pointed out in its 'PGM Market Report', published in November 2016, that Europe remains the largest market for platinum in autocatalysts, with total demand for platinum from the region's automotive sector forecast at 1.77-million ounces in 2016. Diesel catalysts in cars and heavy-duty trucks, as well as offroad transport applications, account for about 95% of overall platinum use in the automotive sector in Europe.

Johnson Matthey expects China to be the only other region where demand for platinum will grow in the automotive sector, owing to tightening limits on diesel-powered-vehicle emissions in that country. Several provinces in China are implementing China 5 limits, which are equal to Euro 5 fuel standards, for diesel vehicles. Johnson Matthey expects legislation requiring the implementation of China 5 limits will be introduced nationally from January 2018.

Demand from the industrial sector increased from 1.67-million ounces in 2015 to 1.78-million ounces in 2016. The expansion of petroleum refining capacity in

Autocatalyst demand for platinum (gross)



Source: Johnson Matthey's PGM Market Report November 2016

North America and China contributed to a 57% year-on-year increase in demand from the petroleum sector to 220 000 oz. This was, however, offset by weaker demand for platinum use in the petroleum sector in Western Europe, which faced capacity curtailments during 2016. The rising demand for fuel cells in Japan and the US, as well as increasing demand for automotive sensors in China, pushed demand for platinum use in other industrial applications up by 9% to 360 000 oz for 2016 (2015: 330 000 oz).

Demand for platinum in the electrical and glass sectors fell by 3% each year-on-year to 160 000 oz (2015: 165 000 oz) and 195 000 oz (2015: 200 000 oz) respectively, while demand in the chemicals sector fell 2% year-on-year to 590 000 oz in 2016 (2015: 605 000 oz).

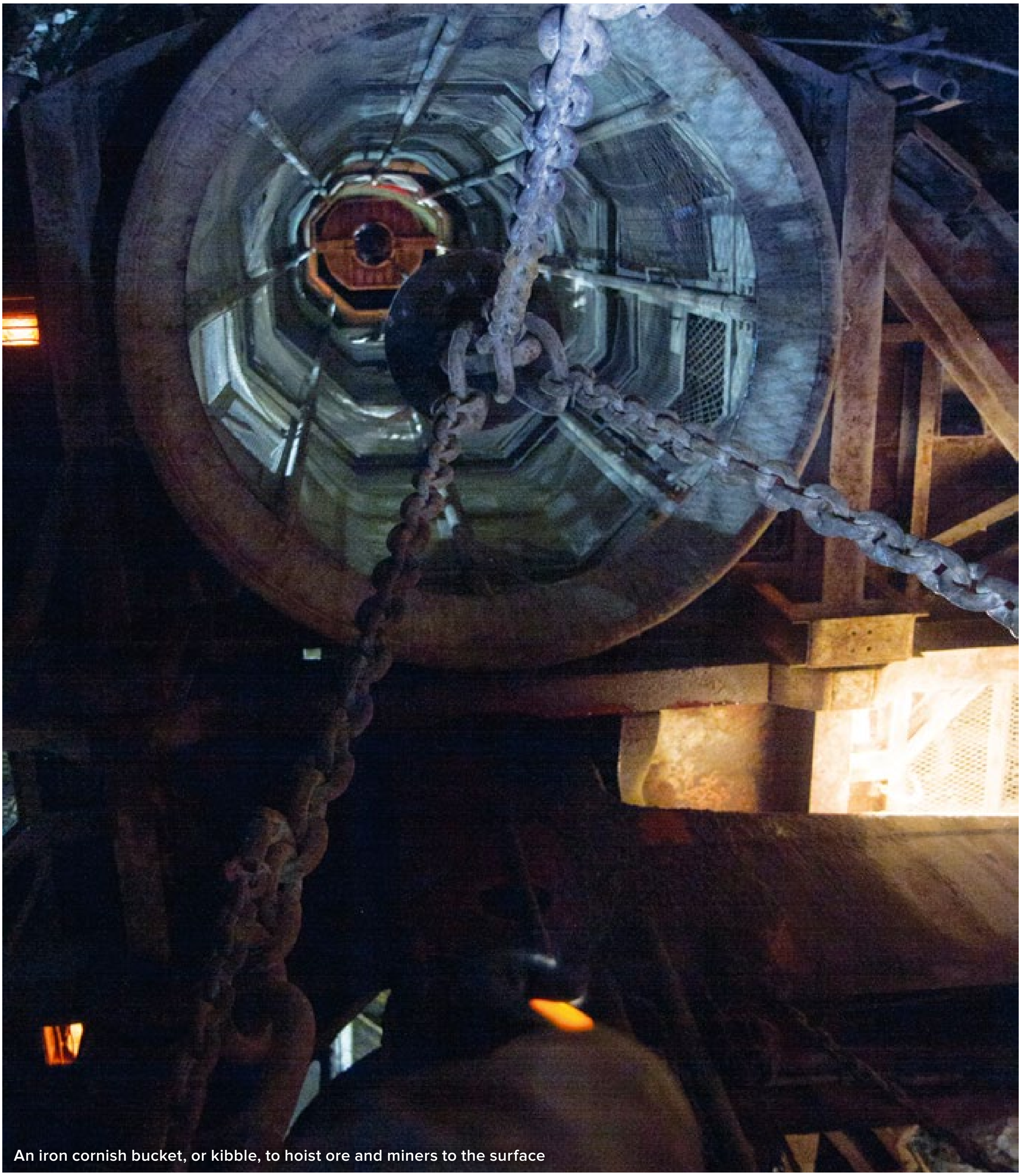
Investment demand, meanwhile, improved by 200 000 oz year-on-year to 505 000 oz in 2016 (2015: 305 000 oz), despite a 10 000 oz drop in exchange-traded fund (ETF) holdings. South African investors reduced their ETF holdings by 155 000 oz in 2016, but this was offset by higher investment in ETFs by UK, US, Japanese and Swiss investors, who increased ETFs invested by 52 000 oz, 59 000 oz, 20 000 oz and 15 000 oz respectively. Bar and coin investment fell by 95 000 oz year-on-year to 430 000 oz (2015: 525 000 oz).

Global platinum jewellery demand, however, decreased by 11%, or 315 000 oz, year-on-year to 2.57-million ounces in 2016 (2015: 2.88-million ounces), as a result of a significant decrease in jewellery demand in China.

In its report, the WPIC explains that Chinese fabricator requirements dropped by 20% year-on-year in

2016 to 1.41-million ounces, as a sluggish retail market contributed to a reduction in platinum inventory in the manufacturing chain and curtailed demand for new metal. Demand for platinum jewellery in India, however, rose 26% year-on-year, owing to the increased use of platinum in men's jewellery, while demand in North America rose 9% year-on-year on the back of more affordable platinum prices and good retail sales growth in the US.

The platinum market ended the year with a 360 000 oz deficit, compared with a 340 000 oz deficit in 2015.



An iron cornish bucket, or kibble, to hoist ore and miners to the surface

Picture by Duane Daws

South African industry overview

South Africa hosts about 80% of the world's known platinum reserves, but the country has been unable, in recent years, to increase production above the 8.70-million-ounce peak achieved in 2006.

Kagiso Asset Management points out in a January 2017 report, titled 'Growing low-cost PGM miners' that the electricity shortages and load-shedding in South Africa significantly hampered production from 2008 to 2012. Thereafter, production was negatively impacted on by labour disruptions, which resulted in the five-month strike across most South African platinum mines in early 2014. This was followed by a significant drop in commodity prices. These factors, along with safety stoppages ordered by the Department of Mineral Resources and an uncertain regulatory environment, have further exacerbated the production challenges, with miners choosing to hold back on investing in new mine supply. Kagiso has further noted that capital investments to increase production at local platinum group metals (PGMs) mines were reduced by 40% between 2008 and 2016.

South Africa produced about 4.24-million ounces of refined platinum in 2016, a decrease on the 4.47-million ounces produced in 2015.

Despite the production challenges, revenue from the South African PGM sector rose by R8.60-billion year-on-year to R95.60-billion in 2016, while its share of mining revenue grew to 27%, from 25% in 2015, according to PwC's 'SA Mine: 8th edition' report, published in September 2016. PwC further points out that platinum mining companies' market capitalisation improved to R178-billion in 2016, from R155-billion in 2015; however, their share of market capitalisation within the South African mining sector decreased from 38% to 32%.

The platinum sector remains a significant employer in the mining industry and the broader economy, having employed 172 369 people in 2016.

Platinum prices have remained low in recent years and many of the larger mining companies have announced measures to lower costs and reduce capital expenditure as a means to weather the low-price environment.

In a separate report, 'Platinum on a knife-edge', also published in September 2016, PwC points out that, by late 2016, platinum prices remained low, while South African producers' input costs were well above inflation, placing margins under pressure. Further, it notes that, from 2012 to 2014, as South African miners faced industrial action, cash that may have been used for new developments was used to ensure the survival of companies, thereby weakening balance sheets, and contributing to the closure or divestment of various mines and shafts by junior miners and the larger miners.

PwC estimates that South Africa's platinum mine supply will decline to about five-million ounces from 2021, despite new mine supply coming on line, as miners continue to face higher costs as shafts get deeper and because of lower grades, owing to the progression of mining from Merensky reef to upper group two reef. Several existing mines are also expected to come to the end of their lives by the early 2020s.

PwC contends that the most likely source of new supply from the country in the medium term will come from existing mines that cut back production of unprofitable ounces. Although this will not require large capital investments, the platinum price will still have to be more sustainable for producers to consider bringing these ounces back into production.

South African miners are, meanwhile, increasingly investing in mechanisation to improve productivity and lower costs. Anglo American Platinum (Amplats) is aiming for 80% of its repositioned portfolio of assets to involve mechanised mining, while Lonmin sees potential for mechanised mining at its Limpopo projects that are currently on care and maintenance.

On the demand side, miners are considering opportunities to encourage growth in new applications that will contribute to increasing demand for PGMs. Sibanye strategic marketing and supply chain VP Anthea Bath pointed out in a December 2016 article published by *Mining Weekly* that gross PGM demand had shown virtually no growth over the past ten years and that there is a need for the platinum industry to collaborate on developing new applications, such as fuel cells, which convert chemical energy from a fuel source into electric current directly from a chemical reaction, to ignite new demand for PGMs. Cooperation by industry players was expected to help drive industrialisation in the country, she added.

Fuel cell applications growing


Impala Platinum fuel cell forklift

Picture by Duane Daws

As many countries seek to mitigate against climate change and reduce their carbon emissions, a lot of attention is being given to the potential of hydrogen as an energy source, along with the development of platinum-catalysed fuel cells. Consequently, at the World Economic Forum in Davos, Switzerland, in January 2017, the 13-member Hydrogen Council was launched to promote the use of hydrogen and fuel cells in reducing vehicle carbon emissions, as well as providing clean energy.

The Hydrogen Council comprises Air Liquide, Alstom, Anglo American, BMW Group, Daimler, Engie, Honda, Hyundai, Kawasaki, Royal Dutch Shell, Linde, Total and Toyota.

In addition to creating fuel cell vehicles, many other applications are also being pursued, many of these by South African companies, given South Africa's importance as the biggest supplier of platinum.

Impala Platinum (Implats) has introduced fuel cell-powered forklifts at its refinery in Springs, Gauteng, and, in February 2017, the company unveiled its 8 MW Doosan fuel cell power plant, which produces energy for the refinery. In the long term, the plant is expected to be expanded to produce 22 MW to 30 MW of power for the refinery. Doosan's fuel cell plants require at least 2.5 kg of platinum per 400 kW system, equating to about 160 000 oz of platinum demand for every 1 000 MW of fuel cell power capacity that is created.

The success of the fuel cell-powered forklifts being used at Implats has prompted studies into the feasibility of fuel cell-powered load haul dumpers (LHDs) for use in underground mining. Estimates are that 8 000 oz of platinum demand will be created for every 1 000 fuel cell-powered LHDs produced.

As part of the South African government's ambitions of increasing local platinum beneficiation and increasing manufacturing output, the Department of Trade and Industry is establishing a fuel cell production special economic zone and manufacturing hub adjacent to Implats' refinery.

Meanwhile, Isondo Precious Metals (IPM) is planning to establish a fuel cell component manufacturing plant to produce catalyst-coated membranes and membrane electrode assemblies (MEAs) for proton exchange membrane (PEM) fuel cells and direct methanol fuel cells, which constitute about 80% of global fuel cell demand. The plant, which is being manufactured in Germany, will be situated at either the Dube TradePort, in KwaZulu-Natal, or at OR Tambo International Airport, in Gauteng. IPM expects the plant to be commercially viable by 2019. IPM also plans to eventually manufacture locally developed fuel cell technologies and may, in future, establish another fuel cell component manufacturing plant in Rustenburg, in the North West.

Anglo American Platinum fuel cell-powered locomotive prototype

Picture by Duane Daws

Another South African entity, the State supported Hydrogen South Africa (HySA) Systems, is set to manufacture components for PEM fuel cells. HySA revealed in June 2016 that it had entered into a deal with Dutch fuel cell stack provider Nedstack and Cape Town-based Africa Green Energy Technologies (AGET) that will result in HySA's designing and manufacturing MEAs for Nedstack for its PEM fuel cells. AGET will develop fuel cell market opportunities in South Africa and the rest of Africa.

On the international front, the C40 Cities Climate Leadership Group, which connect about 90 cities worldwide, and is part of the broader C40 Cities forum, has launched a clean air programme that is expected to support demand growth for platinum, which is a key input into various systems that contribute to lower greenhouse-gas emissions, including vehicle emissions.

Source: *Mining Weekly*

Royal Bafokeng Platinum CEO Steve Phiri, meanwhile, agreed that it was important for the platinum industry to develop new markets for its products and lauded Amplats' efforts in developing fuel cells. He further told *Mining Weekly* in February 2017 that ongoing marketing of PGMs was crucial for the platinum industry, particularly in light of the ongoing effects of lower demand for platinum from the automotive industry amid ongoing antidiesel sentiment. He criticised the global automotive industry for failing to reinforce reliability of diesel engines, and insisting that their engines with platinum-catalysed emission control complied fully with global standards.

Amplats CEO Chris Griffith believes that manufacturing platinum coins and making platinum a reserve currency similar to gold could help to boost demand. Business Day quoted Griffith in October 2016 as stating that the industry tried to persuade government to approve such measures, with no luck. He pointed out that the US, Canada, Japan, Australia and Austria all mint platinum coins, while South Africa, which is the biggest platinum supplier in the world, does not. He further stated that if the South African Reserve Bank did not hold platinum as a reserve currency, no other central bank would either.

Regulatory environment

Proposed changes to the Mining Charter and the promulgation of the Minerals and Petroleum Resources Development Act (MPRDA) Amendment Bill continue to cause great uncertainty in South Africa's mining industry, including among platinum miners.

Mineral Resources Minister Mosebenzi Zwane gazetted a draft version of the new Mining Charter, or Mining Charter Three, for public comment in April 2016, which caught many in the mining industry by surprise. The Chamber of Mines (CoM), in particular, criticised the gazetting of the charter, citing a lack of proper consultation.

In a November 2016 media briefing, CoM CEO Roger Baxter and public affairs and transformation senior executive Tebello Chabana cautioned that implementing the charter in its existing form would have dire consequences for the industry and the South African economy. During the briefing, Baxter pointed out that the revised charter proposed that mining companies contribute a proportion of revenue to an entity, the Mining Transformation and Development Agency. The chamber noted that industry stakeholders were not informed of the existence of this entity prior to the gazetting of the charter. The CoM, therefore, did not have clarity on the role of the entity.

Another concern is the raised targets in terms of the employment of historically disadvantaged South Africans and the new requirement that companies have to procure 30% of their goods and services from 50%+1 black-owned small businesses. Baxter said there was little data available from the mining industry or the DMR on whether there were sufficient qualifying suppliers in South Africa to help companies meet the procurement target.

Law firm Herbert Smith Freehills director Patrick Leyden said in July 2016 that stakeholders were unlikely to agree to the conditions for black ownership set out in the new charter until agreement could be reached on the previous charter's ownership requirements.


Mineral Resources Minister Mosebenzi Zwane

Picture by Duane Daws

The DMR believes that mining companies must retain at least 26% black ownership at all times, with the new charter also setting out that companies must ensure a 26% black ownership level for each mining right. Mining companies, however, strongly believe in the principle of once empowered, always empowered. Many mining companies have entered into deals to ensure the minimum 26% black ownership level, but black economic-empowerment (BEE) partners are not perpetually tied to maintain the shares and many have sold their stakes in the companies, pushing the companies below the desired 26% level.

The CoM approached the High Court in February 2016 for a declaration that companies would not have to engage in additional BEE deals to retain the 26% black ownership level, should BEE partners choose to sell their stakes. By October 2016, the DMR was working with mining companies to reach an out-of-court settlement on the charter. However, despite expectations that these issues would be resolved by the end of that month, Bloomberg reported in November 2016 that the CoM was considering restarting legal proceedings on the matter, saying it had been left out of consultations on the revised charter.

The DMR has, however, denied that it has not been consulting with stakeholders, stating in November 2016 that it had engaged with the CoM since the draft of the charter was gazetted. It pointed out that it had had more engagements with the CoM regarding the charter than it did with any other stakeholders.

In May 2017, Zwane assured stakeholders that the third iteration of the Mining Charter would be gazetted within weeks.

Addressing a media briefing ahead of the DMR's Budget Vote debate, Zwane said the charter, which was supposed to be gazetted at the end of March, was delayed owing to input from stakeholder and investors.

Zwane has said that once the Mining Charter is gazetted it will be "reflective of careful consultations", and be "one of the most revolutionary tools [in South Africa]".

He highlighted that the Mining Charter was not the primary mining legislation, pointing out that it was a regulatory tool that regulated what was stipulated in the MPRDA.

Of the MPRDA he said that it had been tabled before the National Council of Provinces and would revert to Parliament to be enacted soon. In February 2017, Zwane said that he expected the MPRDA to be finalised in June 2017.

There is still some disagreement between industry and the DMR regarding the MPRDA, including about mining and upstream petroleum not having been separated, and that certain provisions appear to give the Mineral Resources Minister undue legislative powers.

Nedbank mining finance principal Paul Miller highlighted in January 2017 that the country's mining industry was unlikely to attract new foreign investment this year, as a result of the regulatory uncertainty. He indicated that the next 12 to 18 months would be a very volatile time for the mining industry. Miller noted that the uncertainty and the absence of firm timelines to implement the new legislation were allowing officials from the DMR to "apply vague guidelines". For example, some mining companies were granted approvals to transfer ownership of assets within weeks, while Section 11 applications under the MPRDA took a long time to process for others he stated.

Meanwhile, DMR mineral policy and promotion deputy director Nhlanhla Jali emphasised in March 2017 that the MPRDA was aimed at driving radical economic transformation – a priority set by the country's incumbent African National Congress – in the mining sector. He maintains that the amendment of Section 11 of the Bill is considered particularly important and, thus, requires Ministerial consent for the transfer of any interest in unlisted companies or changing the controlling interests in listed companies. This enables the Minister to ensure that the rights and interests of affected groups, including employees and near-mine communities, are upheld. This is also aimed at discouraging the dilution of black ownership in mining companies in what, therefore, amounts to a particularly complex situation for investors.

Herbert Smith Freehills partner and Africa practice co-chairperson Peter Leon called on Zwane in February 2017 to withdraw the MPRDA and draft legislation that included recommendations from the African Union's (AU's) African Mining Vision (AMV). He pointed out that South Africa had failed to implement the AMV, despite being a member of the AU and agreeing to implement the vision's good governance, best practice and institutional capacity building protocols.

Another significant issue for mining companies on the regulatory front, especially gold and platinum mines, has been safety stoppages ordered by the DMR mines inspectorate under Section 54 of the Mine Health and Safety Act (MHSA). AngloGold Ashanti and Sibanye have taken the DMR to court as a result of losses they have incurred owing to Section 54 stoppages.

Sibanye filed a R26-million legal claim in January 2017 against the DMR over Section 54 closures at its Kroondal mine, in the North West, in 2016, with the miner saying the DMR had operated outside the scope of its authority. This followed the closure of the mine's five shafts following a fatality at one shaft in August 2016 and the extended implementation of that stoppage.

In November 2016, the Labour Court ruled in favour of AngloGold Ashanti in a similar matter lodged with the court, after its entire Kopanang mine, located on the Free State/North West province border, was brought to a standstill following an incident on Level 44 of Section 12 of the mine.

The CoM has estimated that Section 54 safety stoppages cost the mining industry up to R4.84-billion in lost revenue in 2015, while such safety stoppages implemented from 2012 to 2015 had cost the industry an estimated R13.63-billion. Faced with a Section 54 stoppage as currently applied, a mine has almost no chance of recovering its costs.

The CoM wants the legislation applied differently, in which only affected sections of a mine, where worker safety is in jeopardy, are closed, rather than the whole mine. It contends that MHSA allows for this under Section 55. "In most cases, the issuing of S55s, in the first instance, will resolve the safety issue without harming production or the viability of the mining operation," the CoM has said.

Skills and training

Amid a shortage of skilled prospective employees in the platinum industry, Wesizwe Platinum plans to establish a training centre at its Bakubung mine, near Rustenburg, in the North West, by the end of 2017 to offer theoretical health and safety refresher training courses.

This is in addition to other theoretical and practical training programmes that are run by third parties on behalf of Wesizwe and which include adult education, portable skills training and business skills.

The platinum miner also provides learnership, internship and mentorship opportunities.

Source: *Mining Weekly*

Wage negotiations

Platinum miners and labour unions returned to the negotiating table in 2016 amid fears of a repeat of the five-month strike that impacted on the platinum mining industry and the broader economy in 2014. The strike cost the industry an estimated R24-billion and resulted in thousands of job losses.

The wage agreement that was signed in 2014, and which marked the end of the protracted strike by employees, came to an end on June 30, 2016. For the 2016 wage negotiations, unions wanted a "living wage" for their members, while platinum miners were worried about costs, stating that labour costs contributed 40% to 50% of total costs, while employee productivity was decreasing.

In June 2016, the Association of Mineworkers and Construction Union (AMCU) and the National Union of Mineworkers (NUM) submitted their wage demands, seeking increases ranging between 20% and 50% for the lowest-paid workers. Platinum miners were, however, offering increases closer to the inflation rate.

Law firm Hogan Lovells partner and Africa mining head Warren Beech told *Mining Weekly* in July 2016 that the platinum miners would find it difficult to meet these wage demands, warning that this could result in another protracted strike by union members, causing further damage to the industry.

AMCU president Joseph Mathunjwa, however, remained steadfast in his belief that miners deserved a decent living wage of R12 500 a month, stating in July 2016 that CEOs of South African mining companies earn, on average, 355 times the sector's median earnings.

Negotiations started in July 2016, but were deadlocked in September 2016, with the Commission for Conciliation, Mediation and Arbitration stepping in to mediate.

In October 2016, Mathunjwa revealed that AMCU had reached an in-principle wage agreement with the biggest platinum mining companies – Anglo American Platinum, Impala Platinum and Lonmin – but that finalisation of the agreements would be subject to members' approval.

In November 2016, AMCU and the platinum majors signed a three-year wage deal that would result in the lowest-paid workers receiving increases of 12.5% and higher paid employees receiving increases of 7%.

Main participants

Anglo American Platinum (Amplats), Impala Platinum (Implats) and Lonmin are the most significant global producers of platinum. A fourth significant producer Sibanye has now also been established.

Anglo American Platinum

Anglo American Platinum		
CEO Chris Griffith/Chairperson Valli Moosa		
	Year ended December 2016	Year ended December 2015
Revenue	R61.98-billion	R59.83-billion
Profit/(loss) for the year	R696-million	(R12.44-billion)
Headline earnings/(loss)	R1.87-billion	(R126-million)
Capital expenditure	R3.40-billion	R3.70-billion
Refined platinum production	2.33-million ounces	2.46-million ounces

Amplats is listed on the JSE and is headquartered in Johannesburg. It is 79.9% owned by diversified major Anglo American and is the world's largest primary producer of platinum-group metals (PGMs).

The miner has, in recent years, been focused on removing unprofitable ounces from its production profile, with the reduction of about 400 000 oz from 2013 to 2016. This was achieved through placing its Marikana mine on care and maintenance, consolidating its Rustenburg mines from five to two, consolidating its Union mines from two to one, restructuring the Bokoni mine by placing the Vertical and UM2 shafts on care and maintenance and placing its Twickenham project on care and maintenance. These activities resulted in a significant headcount reduction, which ensured Amplats was appropriately sized.

Further, as part of repositioning its portfolio, the company concluded several disposals of noncore assets in 2016. It sold the Rustenberg Operations, comprising the Bathopele, Siphumelele and Thembelani operations, as well as two concentrating plants, an on-site chrome recovery plant, the Western Limb Tailings Retreatment Plant and associated surface infrastructure, to Sibanye for R4.50-billion. The transaction was finalised in November 2016, with initial cash proceeds of R1.50-billion paid to Amplats. The remaining R3-billion is payable over six to eight years in the form of 35% of distributable free cash flow from the Rustenburg Operations. Amplats has also agreed to buy concentrate from the Rustenburg Operations up to 2018 and to toll treat the material for up to eight years.

Amplats in November 2016 also agreed to sell its 42.5% interest in the Pandora joint venture (JV) to Lonmin for between R400-million and R1-billion in a deferred cash payment over six years. Upon completion of the transaction, Lonmin will own 92.5% of the Pandora JV. As part of the deal, Amplats will rent and use the JV's Baobab concentrator, which is expected to enable it to unlock greater value at its Mogalakwena mine, for a payment of at least R46-million a year for three years. The sale is expected to close in 2017.

In February 2017, Amplats announced the sale of its 85% interest in the Union mine, as well as its 50.1% interest in Masa Chrome Company, to privately owned Siyanda Resources for R400-million in cash and a deferred consideration based on 35% of cumulative distributable free cash flow paid out as an earn-out each year over a ten-year period. In addition to the sales agreement, Amplats will buy concentrate from the Union mine for seven years and will toll treat the platinum, palladium, rhodium and gold until the mine reaches the end of its life. This sales agreement is also expected to close during 2017.

Amplats is, meanwhile, still mulling the possible sale of its 49% stake in the Bokoni JV with Atlatsa Resources. Amplats reported in February 2017 that the JV partners had completed technical work to review the mine's extraction strategy and develop a sustainable and optimised operation. A new optimised mine plan will result in Bokoni's halting openpit operations. Amplats has also not yet taken any decisions regarding the sale of its 50% interest in the noncore Kroondal mine. As this mine currently generates "attractive" cash flow for Amplats, the stake will be sold only "for value".

Amplats also signed an agreement in 2016 to sell the mineral resources within the Amandelbult mining right and surface properties above and adjacent to Northam Platinum's resources to Northam for R1-billion, as well as an ancillary mineral resource within Northam's Zondereinde mining right that borders the Amandelbult mining right. The deal, which is expected to close in 2017, is anticipated to provide Amplats with flexibility in terms of the placement of future mining infrastructure, while the cash consideration will be used to reduce debt.

The disposal of noncore assets is expected to leave Amplats with what it believes are the most competitive PGM assets – the Mogalakwena and Amandelbult mines, in South Africa's Limpopo province, and the Unki mine on the Great Dyke of Zimbabwe, as well as the Bafokeng Rasimone Platinum Mines (BRPM) JV on the western limb of the Bushveld Complex, and the Mototolo and Modikwa JV operations on the eastern limb of the Bushveld Complex. The remaining assets are mainly openpit and more mechanised mines that are expected to deliver higher-margin production and safer operations while ensuring a smaller but highly skilled workforce. Amplats will also retain its processing assets, namely the Polokwane, Mortimer and Waterval smelters.

Amplats is also investing in the development of the PGMs market to offset the risk of lower demand in existing demand segments by seeking opportunities in demand growth areas, including fuel cells, hydrogen and clean energy in general. The miner provides start-up or early-stage capital for companies that are trying to commercialise technologies that use PGMs.

One such company, Germany-based Hydrogenious Technologies, has been developing a hydrogen storage and logistics system that uses liquid organic hydrogen carrier technology to improve the viability of hydrogen refuelling infrastructure for fuel cell electric vehicles. In January 2016, Amplats announced that it was investing $4-million in United Hydrogen Group, which works closely with Hydrogenious Technologies to improve hydrogen logistics and costs.

In September 2016, Amplats also announced an investment in Greyrock Energy, which has developed proprietary catalysts made from PGMs produced by Amplats to convert flare gas, natural gas and biogas into clean liquid transportation fuels, along with hydrogen as a byproduct. The technology is expected to result in increased PGMs demand.

Amplats also revealed in October 2016 the outcome of a 27-month trial of a fuel cell microgrid system that was used to provide electricity for 34 households in the Naledi Trust community in Kroonstad, in the Free

Unki mill

Picture by Anglo American Platinum

State. The microgrid comprised three 5 kW fuel cells, a 73 kWh battery bank, a 14 m^3 methanol fuel tank and inverters and control systems. The system produces an average of 35 MWh/y of electricity.

Amplats expects the trial project to contribute to improvements in the design of such off-grid electricity systems while reducing the size and cost of installing and operating such systems.

Operational performance

Amplats achieved operational improvements at all its mines, as well as an improvement in its financial performance, for 2016.

The platinum miner reported in February 2017 that its headline earnings for the 2016 financial year had increased to R1.87-billion, from a restated loss of R126-million in 2015, while headline earnings a share increased to 713c, compared with a headline loss a share of 48c in 2015. It attributed the improvement to more favourable foreign exchange movements, operating and overhead cost reductions, lower restructuring costs and that R1.80-billion in impairments incurred on loans to Atlatsa Holdings and Bokoni in 2015 were not repeated.

Sales revenue for the year increased by 4% to R61.96-billion, from R59.82-billion in 2015, mainly as a result of a 15% weakening in the rand/dollar exchange rate to R14.63, but partially offset by a 2% year-on-year decrease in refined platinum sales volumes to 2.42-million ounces and lower metal prices. The average rand basket improved by 6% year-on-year to R25 649/oz for 2016 (2015: R24 203 oz).

Meanwhile, Amplats made further progress in reducing its overhead costs during 2016. The company set a target of reducing overhead costs from R5.40-billion to R3.40-billion in 2015. The sale of its Rustenburg operations to Sibanye contributed R700-million to the overall reduction in 2016, while the sale of the Union mine, which was completed in February 2017, will likely contribute a further R300-million reduction in overhead costs.

Amplats also reduced its debt by R5.50-billion from R12.77-billion in 2015 to R7.32-billion in 2016.

Platinum production, including mined and bought ounces, increased to 2.38-million ounces for 2016, up marginally on the 2.34-million ounces produced in 2015, but in line with guidance of 2.30-million to 2.40-million ounces. Output at the Mogalakwena mine increased by 5% year-on-year to a record 412 000 oz, while production at Amandelbult increased by 7% year-on-year to 467 000 oz. Production at the Zimbabwe-based Unki mine increased by 12% to 75 000 oz, while Twickenham, which was put on care and maintenance during 2016, delivered 3 000 oz.

The noncore Rustenburg operations, the sale of which was concluded in November 2016, produced 460 000 oz of platinum in 2016, while the noncore Union mine produced 151 000 oz of platinum. Amplats' JV mines increased output to 785 000 oz, while the company also bought 112 000 oz of platinum from third parties.

Refined platinum production reached 2.34-million ounces, down 5% on the 2.46-million ounces produced in 2015, mainly as a result of a furnace hearth burn-through at the Waterval smelter in September 2016.

Amplats expects metal-in-concentrate production for 2017 to be between 2.35-million and 2.40-million ounces on the back of higher concentrate purchases from third parties, while own mine production is expected to remain at 2016 levels.

Capital expenditure

Amplats has, in recent years, shifted its focus to disciplined capital allocation, prioritising investment in high-value, capital-light projects with short payback periods while holding off on expansion projects until after 2017. It will only then consider expansion projects if its balance sheet allows and the market demands more platinum.

Capital expenditure (capex) for 2016 decreased by 9% to R3.40-billion, from R3.75-billion the year before. Stay-in-business (SIB) capex increased by R200-million to R2.75-billion, while project capex halved to R648-million, from R1.21-billion in 2015. The project capex was focused on the Unki smelter, in Zimbabwe, as well as on housing, Phase 5 expansions at Bathopele mine and Rustenburg ore replacement projects.

Amplats has also invested R474-million on a 600 000 t/y chrome recovery plant at its Amandelbult complex, in Limpopo. Construction on the plant, which uses spiral separation technology to produce metallurgical and chemical grade concentrate chromite, started in April 2014. Operations started in September 2016. The plant operates within existing PGMs processing infrastructure at the Amandelbult complex. Ore from the Tumela and Dishaba mine shafts, where chromite-rich upper group two (UG2) reef is mined, are fed into the main PGM flotation concentrator to extract the majority of PGMs. The slurry is then processed through the chrome recovery plant to extract chromite. The chrome recovery plant is operated in a JV between Amplats subsidiary Rustenburg Platinum Mines, which owns 74% of the JV, and the Baphalane Siyanda Chrome Company, which is operated by members of the Baphalane Be Mantserre Community who own the balance of the JV.

Amplats expects its capex for 2017 to reach R3.70-billion to R4.20-billion, with SIB capex estimated at between R2.90-billion and R3.20-billion and project capex at between R800-million and R1-billion.

Zimbabwe

Security of tenure of its Zimbabwean asset, the Unki mine, remains a concern for Amplats. Under the country's indigenisation aspirations, mining companies are expected to transfer, at no cost, 51% of the ownership of their properties to indigenous Zimbabweans.

Although Amplats had, in November 2012, reached a heads of agreement with government, the transaction had yet to be implemented by late 2016, with Amplats noting in its annual report for 2015 that "the government of Zimbabwe has been refining its thoughts" on indigenisation. It added that President Robert Mugabe had, in April 2016, issued a statement, noting that indigenisation legislation would be amended to include provisions so that existing mining companies operating in the country could comply with the indigenisation requirements by ensuring that at least 75% of gross sales proceeds were spent in Zimbabwe. Should the revised legislation be promulgated, Amplats will be able to retain 100% of Unki by ensuring it meets the targeted local spend.

Miningmx reported in August 2016 that Amplats, however, believed there was a moral justification for still proceeding with an empowerment transaction with employees and the community, although this would entail the sale of a far lower stake in Unki than 51%.

Amplats further noted that increased taxes and demands for local beneficiation were also impacting on its Unki mine. Under regulations imposed in 2014, miners would have to pay a 15% tax on exported unbeneficiated ore. Amplats noted in its 2016 annual report that the proposed tax had been deferred to January 1, 2018, and that construction was progressing on a smelter at Unki to enable the company to beneficiate ore. Miningmx reported that a feasibility study for the smelter had been completed and that construction would start in the third quarter of 2016. The smelter is scheduled for commissioning in the second half of 2018.

Impala Platinum

Impala Platinum		
CEO Nico Muller/Chairperson Mandla Gantsho		
	Year ended June 2016	Year ended June 2015
Revenue	R35.93-billion	R32.48-billion
Profit/(loss) for the year	(R43-million)	(R4.14-billion)
Headline earnings/(loss)	R83-million	R221-million
Capital expenditure	R3.60-billion	R4.30-billion
Refined platinum production	1.44-million ounces	1.28-million ounces
	Six months to December 2016	Six months to December 2015
Revenue	R18.20-billion	R16.81-billion
Profit/(loss) for the year	(R328-million)	R218-million
Headline earnings/(loss)	(R508-million)	R347-million
Capital expenditure	R1.59-billion	R1.89-billion
Refined platinum production	778 500 oz	692 100 oz

Implats is headquartered in Johannesburg and is listed on the JSE. It also has an American Depository Receipt programme in the US. The miner has five operations – Impala, Marula and Two Rivers, located on the Bushveld Complex in South Africa, and Mimosa and Zimplats, located in Zimbabwe's Great Dyke. The company also operates a base and precious metals refinery, Impala Refining Services, in Springs, Gauteng.

Implats' primary operation is its 96%-owned Impala operation – a 14-shaft mining complex – situated on the western limb of the Bushveld Complex that contributes nearly half of overall group production.

Amid a low dollar PGM price environment, Implats outlined in early 2015 a lower-for-longer PGM price scenario and a subsequent response plan to weather the anticipated impacts of continuing low prices. As part of the plan, Implats set itself a target to reduce total operating costs by R1.60-billion in the 2016 financial year through cost optimisation, reprioritising and rescheduling capex, implementing the Impala lease area strategy and strengthening its balance sheet.

Former CEO, Terence Goodlace, who stepped down in December 2016, reported in the company's annual report for 2016 that savings of R1.40-billion had been


17 Shaft, which has been put on care and maintenance

Picture by Impala Platinum

Taking the reins

Nico Muller has joined Impala Platinum (Implats) as CEO with effect from April 3, 2017. His appointment as successor to former CEO Terence Goodlace was announced by the company in December 2016.

Muller holds a BSc Mining Engineering degree and has had a 27-year mining career that has exposed him to multiple commodities, including platinum. Implats has stated that his technical know-how and strategic approach will serve the company well.

Source: Impala Platinum.

achieved – R200-million short of target – with savings of R900-million achieved at Impala.

The repositioning of the Impala operation through the Impala lease area strategy is a key component of Implats' growth plans. The strategy is aimed at lifting production at Impala to about 830 000 oz/y of platinum by 2020, from the 575 200 oz produced in the 2015 financial year. When completed, the lease area will have been transformed into a more concentrated mining operation, providing Implats access to new, modern shaft complexes while lifting mining efficiencies and lowering unit costs.

As part of the strategy, the 8 Shaft and 12 Shaft mechanised sections were closed during the financial year ended June 30, 2016, resulting in job losses of 3 360. Development work continues on 16 Shaft and 20 Shaft – two replacement projects to sustain production while older infrastructure with declining resource availability are closed. Another replacement project, 17 Shaft, has, however, been placed on care and maintenance, in light of "persistently low" metal prices.

In terms of strengthening its balance sheet, Implats successfully raised R4-billion in equity during the 2016 financial year, with the funds to be used to complete the 16 Shaft and 20 Shaft projects. Following its 2016 financial year end, the company negotiated to have R3.25-billion of its existing debt facilities, which were previously available until December 2017, revised to R4-billion that is available until 2021.

Operational performance

A strong operational performance at Zimplats and the recovery in output at its Impala operation following a five-month strike by employees in the prior financial year, lifted Implats' production by 12.7% to 1.44-million ounces in the 2016 financial year, compared with the 1.28-million ounces produced in the 2015 financial year.

The higher production was achieved despite the impact of an underground fire at Impala's 14 Shaft in January 2016, which claimed the lives of four employees and resulted in about R375-million of asset damage.

The shaft was closed for repairs. An estimated 39 000 oz of production were lost as a result of this in the 2016 financial year.

Implats is expecting to report a further 45 000 oz of lost production for the 2017 financial year. This is largely owing to the temporary closure of the decline section at 14 Shaft to effect repairs after the January 2016 fire, a delay in operations at 1 Shaft following the fall-of-ground incident in May 2016, reduced UG2 panel lengths and ongoing regulatory safety stoppages.

Re-establishing the decline section at 14 Shaft has progressed well and full infrastructure capacity was expected by March 2017. The resizing of the UG2 conventional panel lengths across the operation, in line with assessed ground conditions and to significantly reduce the operational risk, has been completed.

Meanwhile, the commissioning and ramp-up of 16 Shaft and 20 Shaft delivered a combined 82 900 oz in the 2016 financial year. Production from these two shafts is expected to ramp up to 310 000 oz by 2020.

Implats produced 778 500 oz of platinum in the six months to December 31, 2016, 12.5% more than the 692 100 oz produced in the six months to December 31, 2015. It was during the interim period that 39 000 oz of platinum production was lost as repair work to Impala's 14 Shaft continued. Implats reported in February 2017 that the re-establishment of the decline section at the shaft would be completed by March 2017.

However, the company reported in April 2017 that ongoing community protests and low platinum group metal prices had forced the company to restructure its Marula operation, which might result in 1 000 job losses. Implats stated that the community protests were related to community members' dissatisfaction with the management of their 50% interest in the Makgomo Chrome project by community representatives. The protest action, along with the closure of the hybrid mining section at the Clapham shaft, had resulted in a 47% year-on-year decrease in Marula's platinum-in-concentrate production to 9 000 oz for the three months ended March 31. Implats has started discussions with labour unions under Section 189A of the Labour Relations Act regarding the restructuring of Marula. The formal engagement process was expected to be finalised by the end of June 2017.

Production for the full 2017 financial year is expected to reach about 1.50-million ounces.

Meanwhile, Implats reported headline earnings of R83-million for the 2016 financial year, down from the headline earnings of R221-million reported for the 2015 financial year. Implats further reported a headline loss of R508-million for the six months to December 31, 2016, compared with headline earnings of R347-million in the prior comparable period. Implats attributed the decrease in headline earnings to a tax credit in the prior comparable period.

Capital expenditure

Amid the low-price environment, Implats has reprioritised its capex to focus on the development of 16 Shaft and 20 Shaft, as well as developments at Zimplats. As such, its capex budget for the 2016 financial year had been reduced by R1.30-billion to R4.20-billion.

During the financial year, R1.30-billion was spent on the 16 Shaft and 20 Shaft at Impala and R981-million at Zimplats, resulting in a R1.90-billion deferment on capex.

Implats expects capex to reach R4.40-billion in the 2017 financial year, with R1.20-billion to be spent at 16 Shaft and 20 Shaft. In the six months to December 31, 2016, R581-million of the targeted R1.20-billion had been spent on the two shafts. The 2.70-million-tonne-a-year 16 Shaft project is expected to reach steady-state production of about 185 000 oz/y by 2020, while the 1.70-million-tonne-a-year 20 Shaft project is expected to reach full production of 125 000 oz/y by 2019.

Implats will spend about R240-million on Impala's 17 Shaft over the 2016 and 2017 financial years. The 2.70-million-tonne-a-year project had previously been expected to produce about 180 000 oz/y of platinum, but has been placed on low-cost maintenance of about R6-million a year. Implats said in February 2017 that modernisation and detailed rescheduling plans to restart the 17 Shaft project would start in two years' time.

A further R2.40-billion in capex will be spent on other developments at Impala and $122-million at Zimplats during the 2017 financial year.

The redevelopment of Zimplats' Bimha mine, which was temporarily closed, as a result of an underground collapse in 2015, is on schedule to reach full production and replace all current openpit operations by April 2018.

To ensure it is able to sustain production levels beyond 2021, Zimplats approved the development of the 2.20-million-tonne-a-year Mupani mine in November 2016, which will replace output from the Rukodzi and Ngwarati mines that will reach the end of their lives in the 2022 and 2025 financial years respectively. Zimplats will spend an estimated $148-million on developing Mupani over the next five years. The mine is expected to reach full output by 2025.

Zimbabwe

Under Zimbabwe's indigenisation legislation, Implats is required to relinquish control of 51% of its operations in the country to local Zimbabweans. Although it signed an indigenisation implementation plan (IIP) with the Zimbabwean government in 2013, Zimplats was still negotiating with government about the IIP in February 2017.

Zimplats is also in negotiations with the Zimbabwe government regarding the compulsory acquisition of a further 27 948 ha within Zimplats' special mining lease. Zimplats released about 36% of its ground to government in 2006 in exchange for cash and indigenisation credits. In March 2013, government informed Zimplats of its plans to acquire the additional land.

As part of its indigenisation efforts, Zimplats also agreed, in early 2017, to transfer a 10% stake in its operations to an employee share ownership trust for $95-million.

Meanwhile, Zimbabwe has also postponed the implementation of a 15% tax on the export of unbeneficiated platinum-group metals to 2018, giving miners more time to establish refinery operations in the country.

Lonmin

Lonmin		
CEO Ben Magara/Chairperson Brian Beamish		
	Year ended Sept 2016	Year ended Sept 2015
Revenue	$1.12-billion	$1.29-billion
Profit/(loss) for the year	($400-million)	($1.90-billion)
Headline earnings/(loss)	($113-million)	($332-million)
Capital expenditure	$89-million	$136-million
Refined platinum production	741 890 oz	759 695 oz
	Six months ended March 2017	Six months ended March 2016
Revenue	$486-million	$515-million
Profit/(loss) for the year	($214-million)	($6-million)
Headline earnings/(loss)	($39-million)	($4-million)
Capital expenditure	R612-million/ $45-million	R403-million/ $27-million
Refined platinum production	301 261 oz	348 885 oz

Lonmin is listed on the LSE and the JSE and owns mining and processing operations in South Africa's Bushveld Complex. Its flagship mine, Marikana, contributes about 95% of overall group output, while the Pandora JV mine contributes the balance. Lonmin has agreed to buy JV partner Amplats' 42.5% share in Pandora, with the deal expected to be finalised this year.

In May 2017, Lonmin also bought the 7.5% interest in Pandora held by Northam's Mvelaphanda Resources for R45.50-million plus an estimated R6-million to R8-million refund of any cash calls paid by Mvelaphanda to the Pandora JV between January 1, 2017, and the finalisation of the deal.

Once the transactions are finalised, Lonmin will own 100% of Pandora. The company will be able to access a portion of the Pandora mining right from its existing Saffy shaft, which will enable it to defer R1.60-billion in expected capital expenditure at that shaft between 2018 and 2020, without impacting on output from the shaft.

Like its counterparts, Lonmin has, in recent years, had to adapt to a low-price environment. The company devised a business plan in 2014 to reposition the business in line with the low-price environment. The repositioning includes removing high-cost production ounces, rightsizing the workforce, improving operational efficiencies and reducing capex while ensuring the efficient running of operations.

Lonmin's operations have been split into three categories, Generation 1, 2 and 3, with the Generation 1 shafts – East 1, East 2, East 3, W1, Hossy, Newman and 1B – being older shafts that are nearing the end of their lives. The Generation 1 operations also include the opencast mine.

Shaft 1B was placed on care and maintenance in October 2015. At the opencast mine, the Merensky pit was closed but the production of low-cost UG2 ounces continues. This is, however, expected to come to an end in 2017.

Further, the Hossy shaft is due to be placed on care and maintenance in 2017, while the Newman shaft is being mined by contractors under a contract mining agreement that is reviewed yearly. Shafts E1 and W1, which were meant to be placed on care and maintenance, have also received a lifeline, with a revised cash generative contractor development plan having been implemented at these two contractor-managed operations.

The company's current focus is on its Generation 2 shafts – K3, Rowland, Saffy and 4B – which are its larger and newer shafts.

The K4 shaft, currently the only Generation 3 shaft, is also considered an important future operation for Lonmin; however, it has been placed on care and maintenance.

CEO Ben Magara, who in March 2017 also took on the role of Lonmin COO following the resignation of Ben Moolman, reported in the group's annual report for 2016 that the reorganisation of the business had been concluded in the first half of the 2016 financial year. This resulted in about 5 433 employees and contractors having left between June 30, 2015, and March 31, 2016. Further, about 1 428 employees were reskilled and reassigned to vacant positions in the company.

Magara pointed out that the reorganisation had contributed to a turnaround in underlying operating profit to \$7-million for the financial year ended September 30, 2016, compared with a loss of \$134-million in the 2015 financial year. Underlying costs had also decreased by 3.2% to about R14.10-billion, with Lonmin having achieved a R1.30-billion reduction in costs for 2016 – 86% higher than the targeted R700-million.

Meanwhile, the company announced in May 2017 that it would move its South African headquarters from Johannesburg, Gauteng, to Marikana, in the North West, to "enable maximum focus on production".

Operational performance

The reorganisation of Lonmin's operations did, however, negatively impact on mining production in the financial year to September 2016, with tonnes mined down 8.8% year-on-year to 10.31-million tonnes (2015: 11.30-million tonnes). This was mainly the result of a 1.10-million-tonne decline in output from the Generation 1 shafts.

Production at the Generation 2 shafts, which represent about 78% of total tonnage production, increased by 4% year-on-year to 8.06-million tonnes (2015: 7.75-million tonnes). Productivity at these shafts also increased by 5.4% year-on-year to 5.9 m^2 a person – a five-year high.

The Saffy shaft reached full production during the 2016 financial year and produced 2.06-million tonnes (2015: 1.76-million tonnes), representing a 16.9% year-on-year increase in mined tonnages.

Tonnes mined at the Generation 1 shafts decreased to nearly 2.20-million tonnes in the 2016 financial year, compared with 3.27-million tonnes in 2015.

The overall lower mined tonnes resulted in a 9.6% year-on-year decrease in platinum metal-in-concentrate to 663 575 saleable platinum ounces.

Meanwhile, about 592 000 t of production was lost as a result of Section 54 safety stoppages ordered by the Department of Mineral Resources (DMR), as well as management-induced safety stoppages; however, this was an improvement on the 872 000 t lost to safety stoppages in the 2015 financial year.

Lonmin noted in its annual report for 2016 that although the number of Section 54 stoppages had remained high in the first nine months of that financial year, the duration and frequency of the stoppages had decreased, owing to the company's continued interaction with the DMR and unions. During the fourth quarter of the financial year, only 95 000 t of production was lost as a result of safety stoppages ordered by the DMR and Lonmin's management, compared with 297 000 t in the fourth quarter of the 2015 financial year.

Refined platinum production decreased by 2.34% to 741 890 oz (2015: 759 695 oz) for the 2016 financial year. To offset the impact of the lower mined tonnages, Lonmin had embarked on a smelter clean-up project, which involved the reprocessing of stockpiles of used refractories and some revert tails generated during the slag plant construction, which contain low-grade PGMs, to increase refined platinum ounces. The smelter clean-up project delivered 73 186 oz of platinum in the 2016 financial year and was expected to continue into the first half of the 2017 financial year.

Platinum sales in 2016 reached 735 747 oz (2015: 751 560 oz), exceeding guidance of 700 000 oz. Lonmin expects sales to reach between 650 000 oz and 680 000 oz for the 2017 financial year.

For the six months ended March 31, 2017, platinum sales fell by 15.2% year-on-year to 306 996 oz, as a result of lower production.

Total tonnes mined in the interim period decreased by 7.6% year-on-year to 4.70-million tonnes, as a result of the removal of high-cost production from the Generation 1 operations and a weak mining performance at K3. The latter was attributed to a "strained relationship" between the operation's management and the labour union that negatively impacted on production at K3 for four months to the end of January 2017.

Lonmin stated in May 2017 that the impasse between management and the union had been resolved, with output at K3 improving to 276 000 t in March – the highest monthly production at the shaft in 29 months.

Meanwhile, tonnes lost because of Section 54 safety stoppages decreased to 194 000 t in the interim period, compared with 234 000 t lost in the first half of the prior financial year.

Refined platinum production for the six months to March 31, were, nevertheless 13.7% lower year-on-year at 301 261 oz.

Capital expenditure

Lonmin has resolved to maintain its capex at the minimum level required to ensure the safe and efficient running of its operations. In the 2016 financial year, the company spent $89-million (2015: $136-million) in capex, compared with a revised guidance of $105-million, owing to a delay in its bulk tailings treatment (BTT) project.

The company has also decided to align its capex guidance with costs and will, therefore, now report this guidance in rands rather than dollars. Capex for the 2017 financial year is targeted at between R1.40-billion and R1.50-billion.

Lonmin invested a further R612-million ($45-million) in capex in the six months to March 31, 2017, compared with R403-million ($27-million) in the first half of the prior financial year.

Meanwhile, the BTT project, which will be operated by a contractor, involves the remining of Lonmin's Eastern tailings dam and the reprocessing of 26-million tonnes of tailings material at 300 000 t/m to produce 29 000 oz/y of platinum over seven years. Lonmin secured $50-million in third-party funding to finance the project and expects it to ramp up to full production by the end of 2018.

Lonmin has indicated that there is also potential to implement a similar project to remine tailings at its Western tailings dam in future.

Meanwhile, capex will also be invested in accessing two additional levels on the UG2 decline at the K3 shaft, as well as in starting production from the Middelkraal resource, or MK2, at the Rowlands shaft through the existing Rowland shaft infrastructure in 2018.

In the longer term, and pending improvements in PGM prices, capex is likely to be invested on the K4 shaft, opening further levels at the Saffy shaft, the deepening of Pandora E3 shaft and the E4 Pandora project.

Community demands

In May 2017, Lonmin raised the alarm about ongoing protests by the Bapo Ba Mogale community, which it said included violent acts, damage to property and the intimidation of Lonmin employees.

Lonmin, which has cut its employee numbers by some 6 000 in recent years, said the community had demanded 1 000 jobs at Lonmin for community members and 500 cadet positions for unemployed youth in the community. The company added that these demands could not be met without threatening the sustainability of the business. Discussions with the community members were ongoing by mid-May 2017.

Source: *Mining Weekly*

Sibanye

Sibanye		
CEO Neal Froneman/Chairperson Sello Moloko		
	Year ended December 2016	Year ended December 2015
Revenue	R31.24-billion	R22.72-billion
Profit/(loss) for the year	R3.27-billion	R538.20-million
Headline earnings/(loss)	R2.49-billion	R674.60-million
Refined platinum1 production	238 662 oz	Nil

1: The full-year results include a nine-month contribution from the operations acquired from Aquarius Platinum and a two-month contribution from the Rustenburg Operations acquired from Anglo American Platinum.

Precious metals miner Sibanye was previously focused on gold mining and owns four underground and surface gold operations, as well as a number of gold development projects, in South Africa. However, in 2016, it entered the platinum sector by buying out Aquarius Platinum and certain operations formerly owned by Amplats.

The R4.30-billion acquisition of Aquarius Platinum, which is now a subsidiary of Sibanye, was concluded in April 2016, with Sibanye taking control of Aquarius's 50% stake in the Kroondal JV with Amplats, and its 50% stake in the Mimosa mine, in Zimbabwe, which is a JV with Implats. It also has a 91.7% interest in Platinum Mile, a tailings retreatment facility located at Rustenburg Platinum Mine's (RPM's) lease area adjacent to Kroondal. Platinum Mile recovers PGMs from the tailings streams of platinum and chrome mining companies in the vicinity of its own operations.

Kroondal is located on the western limb of the Bushveld Complex, in the North West, and is managed through a 50:50 pool-and-share agreement with Amplats. It uses five operating decline shafts to mine the UG2 reef in the Townlands and Kroondal orebodies. The operation includes two concentrator plants with a combined processing capacity of 570 000 t/m. It produces PGMs-in-concentrate that are smelted at Amplats' RPM under an offtake agreement.

The Mimosa mine, in Zimbabwe, is a relatively shallow underground mine that is accessed through a single shaft. The operation also includes a 185 000 t/m concentrator.

In early November 2016, Sibanye gained control of Amplats' Rustenburg Operations – comprising the Bathopele, Siphumelele (including Khomanani) and Thembelani (including Khuseleka) mining operations, two concentrating plants, an on-site chrome recovery plant and the Western Limb Tailings Retreatment Plant – in a R3.12-billion transaction.

The Rustenburg Operations are located on the western limb of the Bushveld Complex. According to Sibanye, these operations are quality, long-life assets that produce an estimated 800 000 oz/y of PGMs.

Following the acquisitions, Sibanye established its separate gold and platinum divisions, with the platinum division initially headed up by Jean Nel. He, however, resigned in November 2016 and was succeeded by Robert van Niekerk.

Operational performance

The platinum division produced 238 662 oz of production in the financial year to December 31, 2016. For the final six months of the financial year, attributable PGM production reached 327 990 oz of platinum, palladium, rhodium and gold (4E). Attributable production from the Rustenburg Operations for November and December was 137 787 oz of 4E. Sibanye noted in February 2017 that while production from the Rustenburg Operations was in line with expectations, it was unsustainable and pointed to the need to achieve the cost synergies identified during due diligence undertaken prior to buying the assets.

Sibanye expects to realise operational synergies of about R800-million a year from the combined Aquarius and the Rustenburg Operations over a three-year period. R400-million of this is expected to be realised by the end of the 2017 financial year.

The Rustenburg Operations contributed revenue of R1.66-billion and a loss of R242.60-million to Sibanye's results for the two months since the finalisation of the transaction.

Sibanye had, at the time of acquiring the Rustenburg operations, also entered into a broad-based black economic-empowerment transaction with a consortium comprising the Rustenburg Mine Employees Trust, the Rustenburg Mine Community Development Trust, Bakgatla-Ba-Kgafela Investment Holdings and Siyanda Resources, giving the consortium a 26% shareholding in these operations.

Mimosa mine mill feed silos and concentrator plant

Picture by Aquarius Platinum

Meanwhile, attributable production from the Kroondal, Mimosa and Platinum Mile operations reached 190 203 oz of 4E. Aquarius contributed R2.10-billion to revenue for the nine months to December 31 while posting a profit of R223.60-million.

US acquisition

Within months of acquiring its first platinum assets, Sibanye also made a play for NYSE-listed and Colorado headquartered Stillwater Mining Company (SMC), which is the only PGM miner in the US. It owns two underground PGM mines – the Stillwater and East Boulder mines – as well as the Blitz PGM project, in Montana.

The two operational mines are expected to produce between 535 000 oz and 545 000 oz of two-element (2E, or platinum and palladium) PGMs in the 2016 financial year, while the Blitz project is expected to start operating in early 2018 and ramp-up to full output of between 270 000 oz and 330 000 oz of 2E PGMs by 2021/22. Stillwater's assets also include the Columbus metallurgical complex, which produces a PGM-rich filter cake that is shipped to a third-party precious metals refinery.

Sibanye announced in December 2016 that it would acquire SMC for $18 a share, or about $2.20-billion in aggregate, which equates to about R30-billion. Sibanye CEO Neal Froneman commented at the time that the transaction was a "transformational opportunity" for the company to acquire high-quality, low-cost PGM assets at a favourable point in the commodity cycle.

Sibanye further highlighted that the transaction expanded Sibanye's PGM portfolio with high-grade reserves, and provided near-term, organic, low-cost growth through the Blitz project, while the Columbus metallurgical processing complex provided Sibanye with a mine-to-market PGM business.

The transaction, which was expected to be concluded in the second quarter of 2017, is being funded through a $2.65-billion bridge loan commitment from Citi and HSBC. The loan will also be used to repay Stillwater's $500-million convertible debentures. Once the deal is concluded, Sibanye plans to raise new debt and between $750-million and $1-billion in equity through a rights issue to maintain its dividend policy and preserve its long-term financial flexibility.

Some analysts have questioned whether this was the best possible deal for Sibanye, with Business Day reporting in January 2017 that analysts expected there to be a "sizable discount" on the rights issue. The publication quoted Nedbank analysts Leon Esterhuizen and Arnold van Graan as saying that the discount was likely to be about 25%. The publication further reported that Sibanye could have acquired fellow South African miner Lonmin at a much lower price. Sibanye and Lonmin were reportedly in talks about a potential merger when Sibanye announced the Stillwater deal.

In mid-February 2017, Sibanye announced that it had successfully closed the syndication of the bridge facilities needed to finalise the acquisition of SMC. The facilities include three tranches, with the first a $750-million bridge-to-equity raise that will be repaid following a rights issue by Sibanye. The second tranche will involve a $300-million bridge-to-cash facility and the third a $1.60-billion bridge-to-debt capital raise.

Earlier in the month, the company had revealed plans to potentially increase the size of the equity component of the financing package to $1.30-billion, with Sibanye stating that increasing the equity component would be "prudent" in the strong rand environment prevailing at the time.

Sibanye received approval from the South African Reserve Bank during February 2017.

The Committee on Foreign Investment in the United States, or CFIUS, extended its investigation into the proposed transaction in March 2017. There was speculation that approval might not be granted, owing to Sibanye's major Chinese shareholding. Bloomberg also reported on April 10, 2017, that the CFIUS had a big backlog of deals that were yet to be reviewed and that it might miss the April 14 deadline to conclude its investigation into the Sibanye-Stillwater deal.

On April 18, the CFIUS gave its approval for the deal, the last of the regulatory conditions that had to be met for the deal to proceed.

Shareholders of Sibanye and Stillwater also voted in favour of the transaction at two separate general meetings held later in April. The transaction was officially finalised in early May 2017.

The report quoted analysts noting that although the CFIUS was not generally inclined to block transactions, the repeated delays might result in deals being terminated.

Other platinum producers

African Thunder Platinum

Canadian firms Aberdeen International and Pala Investments each own a 47.5% stake in African Thunder Platinum (ATP), which, in 2015, acquired a 69.75% interest in the Smokey Hills mine, in Limpopo, and a 49% interest in the Kalplats joint venture (JV) project, in the North West, from Australia Platinum.

Smokey Hills, a shallow underground mine, was placed on care and maintenance in September 2012. ATP restarted mining operations in January 2015, but again halted mining activities in April 2016 to find ways of optimising the value of the mine.

Kalplats, meanwhile, is a shallow platinum/palladium resource located on the Kraaipan greenstone belt and is jointly owned by African Rainbow Minerals (ARM).

ATP appointed Brett Richards CEO in June 2016 and mandated him to advance plans to restart underground mining at Smokey Hills, as well as to continue the development of Kalplats. *Mining Weekly* reported at the time that ATP would allocate more funds to investigating means to improve mining output at Smokey Hills while considering potential openpit mining scenarios and seeking opportunities to raise plant capacity through the tolling of external ore sources.

Further, Kalplats was expected to move towards definitive bankable feasibility stage.

ARM Platinum

ARM Platinum		
Group CEO Mike Schmidt/Platinum CEO Francois Uys/Chairperson Patrice Motsepe		
	Year ended June 2016	Year ended June 2015
Headline earnings/(loss)	(R10-million)	R405-million
PGM production (6E) (100% basis)	851 924 oz	776 996 oz
	Six months ended December 2016	Six months ended December 2015
Headline earnings/(loss)	R179-million	(R9-million)
PGM production (6E) (100% basis)	407 846 oz	437 207 oz

6E – platinum, palladium, rhodium, iridium, ruthenium and gold

ARM Platinum is a division of diversified miner ARM, and owns an interest the Modikwa and Two Rivers platinum mines, and the Nkomati nickel mine.

The Modikwa mine, in which ARM Platinum holds a 41.5% stake, is a JV with Anglo American Platinum (Amplats), which has a 50% interest, and local communities, which hold an 8.5% stake. The Two Rivers mine is a JV with Impala Platinum (Implats), which holds a 49% interest, and ARM Platinum, which holds the balance. The two companies have entered into an agreement to increase ARM's shareholding in the mine to 54%, but this remains subject to Ministerial consent. ARM Platinum also holds a 50% interest in the Nkomati mine, with JV partner Norilsk Nickel owning the balance.

For the financial year to June 30, 2016, platinum group metal (PGM) production on a 100% basis increased by 10% to 851 924 platinum, palladium, rhodium, ruthenium, iridium and gold (6E) ounces (2015: 776 996 6E ounces), compared with the 776 996 oz produced in the prior financial year, mainly as a result of increased milling volumes. The Two Rivers mine achieved record output of 400 722 6E ounces, compared with the 372 592 oz produced in the 2015 financial year.

The average rand basket price for Modikwa and Two Rivers decreased by 6% year-on-year in the 2016 financial year, while the rand nickel price was down an estimated 22% year-on-year. The low PGM and nickel prices negatively impacted on ARM Platinum's financial performance in the 2016 financial year, resulting in the division posting a R10-million headline loss, compared with headline earnings of R405-million in the 2015 financial year.

For the six months to December 31, 2016, PGM production was negatively impacted on by a 45% year-on-year decrease in PGM production at Nkomati, resulting in overall production decreasing by 7% year-on-year to 407 846 6E ounces, compared with the 437 207 oz produced in the six months to December 31, 2015. The PGM production at Nkomati fell to 6 627 t, compared with 11 554 t in the prior comparable period, owing to reduced tonnes mined and lower grades.

Higher chrome prices, which benefited the Two Rivers and Nkomati mines; a R200-million mark-to-market adjustment at Nkomati on the realisation of debtors; and higher volumes at Two Rivers, contributed to headline earnings of R179-million for the interim period, compared with a R9-million loss in the prior comparable period.

Owing to weak market conditions, it was decided in August 2015 to reduce capital expenditure (capex) at the Modikwa mine. For the 2016 financial year, capex at the mine was reduced by about 56% to R282-million, from the R646-million spent in the 2015 financial year. The reduction was achieved by deferring capex at the North shaft to delay development of Level 9; the restructuring of the South 1 and 2 shafts; the redeployment of stoping labour from the high-cost South 1 shaft to the lower-cost South 2 shaft; and continuing with the implementation of the sinking of the South 2 shaft to improve mining flexibility. Phase 1 of the South 2 shaft sinking was completed during the 2016 calendar year and will increase production capacity to 50 000 t/m of ore by 2019. Ore output will increase to 100 000 t/m in Phase 2.

Meanwhile, ARM Platinum reported in March 2017 that North shaft levels 7 and 8 are fully equipped with the required mining infrastructure and that the chairlift installation and construction to surface was commissioned in February 2017.

Capex at all ARM Platinum's operations, on a 100% basis, decreased by 31% to R1.10-billion in the 2016 financial year, compared with the R1.60-billion invested in the 2015 financial year. Capex of R488-million and R282-million was invested at Nkomati and Two Rivers respectively during the financial year. Major capex items at Nkomati included a new cleaner bank for the MMZ plant, and the installation of an anchored pile wall and a slope stability radar. At Two Rivers, most of the capex was invested in the deepening of the Main and North declines, as well as electrical and mechanical installations, followed by fleet replacement and refurbishment.

Focus on these areas continued during the six months to December 31, 2016, with 45% of the R175-million in capex at Two Rivers spent on fleet replacement and refurbishment, and 43% on the deepening of the two declines and the electrical and mechanical installations. Capex for Two Rivers was, however, slightly lower than the R180-million invested in the six months to December 31, 2015.

Capex at Nkomati fell considerably, to R19-million in the six months to December 31, 2016, from R108-million in the prior comparable period. R16-million was spent on the start of construction on a second anchored pile wall at the mine during the interim period. Capitalised waste stripping costs at Nkomati, however, increased by 66% to R364-million in the interim period, compared with R220-million in the prior comparable period, as waste mining volumes increased, owing to the opening up of ore reserves to gain mining flexibility.

Two Rivers mine

Picture by ARM Platinum

Capex spent at Modikwa during the interim period to December 31, 2016, decreased to R160-million, from R195-million in the prior comparable period.

Atlatsa Resources

Atlatsa Resources		
CEO Harold Motaung/Chairperson Tumelo Motsisi		
	Year ended December 2016	Year ended December 2015
Revenue	C$162.70-million	C$205.69-million
Profit/(loss) for the year	(C$66.28-million)	(C$368.98-million)
PGM production	159 241 oz	190 740 oz

Atlatsa Resources is a black-owned PGMs producer that is listed on the TSX and JSE. It operates the Bokoni platinum mine, which it owns in joint venture (JV) with Amplats. Amplats is, however, seeking to sell its stake in the mine.

In light of depressed PGM prices, Atlatsa and Amplats embarked on a restructure plan at Bokoni in September 2015 to reduce its cost structure and raise its production of higher-grade ore from underground operations. The restructure was completed in June 2016. This resulted in the older UM2 and Vertical Merensky shafts being placed on care and maintenance, while the openpit operations were closed.

As a result, the mine's labour complement was reduced by 28%, from 5 657 direct and contractor employees in September 2015 to 4 074 as at June 30, 2016. Contractor employees at Bokoni decreased by 50.8%, while direct employees decreased by 15.4%. The mine's cash operating costs were reduced by 14.6% between September 2015 and June 2016, mainly as a result of the decrease in the labour force at the mine.

The focus has now shifted to the development of the Middelpunt Hill UG2 and Brakfontein Merensky underground shafts that are ramping up to steady state. By the end of March 2017, the Middelpunt Hill UG2 shaft was operating at 80% of its targeted steady-state volumes of 60 000 t/m, with Atlatsa expecting the shaft to reach steady-state volumes by the second quarter of 2018.

The Brakfontein Merensky shaft, meanwhile, was operating at 50% of its targeted steady-state volumes of 90 000 t/m by March 2017. It is expected to reach steady state by the second quarter of 2019.

To ensure that production ramp-up targets can be met, Atlatsa is implementing a development plan to ensure sufficient stoping face length is made available. The plan includes improving waste handling infrastructure at the mine, upgrading trackless mining equipment and appointing a contract miner.

Meanwhile, Atlatsa is also considering options for extracting chrome from its upper group two (UG2) tailings. It estimates that the UG2 ore at Bokoni contains 25% to 30% chromite and that 10 000 t/m to 15 000 t/m of UG2 chrome concentrate could be produced.

Atlatsa's PGM production decreased to 159 241 oz in the 2016 financial year, compared with the 190 740 oz produced in 2015. As a result of the lower output, as well as a 6.4% decrease in the average dollar platinum price, revenue fell by 20.9% year-on-year to C$162.70-million (2015: C$205.69-million). The company, however, narrowed its loss for the year to C$66.28-million, compared with the C$368.98-million loss incurred in 2015.

Atlatsa invested capex of C$25.2-million (2015: C$25.7-million) in the 2016 financial year, with 38% of the amount invested in sustaining capital and 62% in project expansion.

Eastern Platinum

Eastern Platinum (Eastplats) is based in Vancouver, Canada, and is listed on the TSX and the JSE. It owns four PGM assets on the eastern and western limbs of the Bushveld Complex. The assets include the Crocodile River mine (CRM), which has been placed on care and maintenance, as well as the Kennedy's Vale, Spitzkop and Mareesburg projects.

Eastplats is not currently producing any PGMs and has undergone significant corporate changes in recent months.

In June 2016, a newly incorporated Hong Kong-based company Ka An Development, which had acquired 13.79% of Eastplats' shares in issue from Invesco Canada, initiated a process to have the then board of Eastplats removed and replaced with six new directors. Ka An had the support of another dissident shareholder K2 Principal Fund. Despite its efforts to prevent the board takeover, shareholders voted to have the former board ousted and replaced with the proposed new directors during the company's annual general meeting in July 2016.

Meanwhile, amid the battle for control of the company, the previous board agreed in late June 2016 to sell its South African subsidiary Barplats Mines, which holds the CRM, to Chinese firm Hebei Zhongheng Tianda Platinum (HZT) for $50-million. HZT was expected to invest in the restart of operations at CRM.

At the time, Eastplats said it would retain its Kennedy's Vale, Spitzkop and Mareesburg projects.

In early July 2016, before the board ouster, Eastplats also agreed to buy out certain minority shareholders' interests in Eastplats' projects for $13.37-million, in line with the terms of the Barplats sales agreement with HZT.

Upon taking control of the company, the newly elected Eastplats board immediately launched an investigation into these two transactions. Although the Competition Commission approved the $50-million sale of Barplats to HZT in November 2016, the ongoing review of the transaction by the new Eastplats board prompted HZT to file a civil claim in Canada's British Columbia Supreme Court in December 2016 over the alleged "repudiation and breach of the share purchase agreement" entered into by the former board. Eastplats filed a response to the court in January 2017.

Barplats shareholders also rejected the transaction during a vote on the deal in February 2017.

Meanwhile, in July 2016, the newly elected board appointed Diana Hu as CEO of Eastplats and, in November 2016, appointed Rowland Wallenius as CFO.

The company announced in early April 2017 that it was unable to file its financial statements for the 2016 financial year because it could not deliver its audit report amid the ongoing investigations into transactions entered into by the former board.

The company is also facing legal challenges. In April 2017, British Virgin Islands company AlphaGlobal Capital applied to the High Court, in Pretoria, for the winding-up of Eastplats, which it said was unable to pay its debt. AlphaGlobal said Eastplats' financial statements demonstrated that the company was no longer able to operate as a going concern. It further stated that unless a liquidator was appointed to dispose of assets to the benefit of creditors and shareholders, "opportunistic" operators would continue to deplete the assets.

A month earlier, Eastplats informed its shareholders that it would oppose a claim by AlphaGlobal, seeking payment over a 2007 agreement wherein Easplats acquired a further 5% interest in Barplats Investments. Eastplats said it did not believe any amounts were owed to AlphaGlobal.

In May 2017, Eastplats announced that, as part of a review of available development opportunities, it planned to undertake additional limited infill drilling at the Mareesburg openpit project, in Limpopo, to determine resources and reserves.

Glencore

Diversified major Glencore acquired certain platinum assets when it bought out Xstrata in 2013. However, given that platinum is noncore to the group, it has opted to sell its platinum interests. In 2015, it divested its 23.9% stake in Lonmin through a distribution in specie to Glencore shareholders.

In February 2017, the group announced the sale of its Eland platinum mine, which had been placed on care and maintenance in 2015, to Northam Platinum for R175-million. The deal included the sale of Eland's two mining rights, surface and underground infrastructure, a chrome spiral recovery plant, a tailings storage facility, two decline systems and surface support infrastructure.

Glencore, however, plans to retain its interest in the 50:50 Mototolo JV with Amplats. The mine produced about 116 000 platinum ounces in Amplats' 2016 financial year.

Northam Platinum

Northam Platinum		
CEO Paul Dunne/Chairperson Lazarus Zim		
	Year ended June 2016	Year ended June 2015
Revenue	R6.10-billion	R6.04-billion
Profit/(loss)	(R508.26-million)	(R1.03-billion)
Headline earnings/(loss)	(R492.84-million)	(R794.96-million)
Refined production (3PGE + gold)	453 228 oz	422 074 oz
	Six months ended December 2016	Six months ended December 2015
Revenue	R3.46-billion	R3.21-billion
Profit/(loss)	(R226.60-million)	(R272.97-million)
Headline earnings/(loss)	(R226.37-million)	(R231.92-million)
Refined production (3E PGM + gold)	234 185 oz	247 399 oz

Booysendal mine

Picture by Northam Platinum

JSE-listed Northam is a midtier PGMs producer. Its two primary operating assets are the Zondereinde and Booysendal PGM mines, located on the western and eastern limbs of the Bushveld Complex respectively. Zondereinde, which has a mine life of more than 20 years, produces about 280 000 oz/y of PGMs. Northam's metallurgical operations, including a smelter and base metals recovery plant, are located on the Zondereinde lease.

The Booysendal mine, meanwhile, produces about 160 000 oz/y of PGMs. Northam in 2015 acquired the Everest platinum mine, which is contiguous with Booysendal, from Aquarius Platinum and has integrated that mine with Booysendal, laying the foundation for the development of the new Booysendal South mine.

Northam also owns a 7.5% interest in the Pandora JV with Amplats and Lonmin, as well as a 50% stake in the Dwaalkop JV.

Northam narrowed its net profit to R508.26-million for the financial year ended June 30, 2016, compared with the loss of R1.03-billion recorded in the 2015 financial year. For the six months to December 31, 2016, the PGMs producer incurred a loss of R226.60-million, compared with a loss of R272.97-million recorded for the six months to December 31, 2015.

Refined production of platinum, palladium, rhodium and gold (3PGE + Au) for the 2016 financial year reached 453 228 oz, compared with the 422 074 oz produced in the prior financial year. In the six months to December 2016, Northam's refined 3PGE + Au production reached 234 185 oz, compared with the 247 399 oz produced in the prior comparable period.

The company is planning to expand production to 850 000 oz by 2022.

As part of its growth plans, Northam acquired a portion of the Amandelbult mining right, which is contiguous with the Zondereinde mine, in October 2016, from Amplats for R1-billion; as well as acquiring a portion of the Elandsfontein farm overlying a part of the Amandelbult mining right, in exchange for transferring a portion of the Zondereinde mining right to Amplats. Northam said at the time that the acquisition would extend the Zondereinde economic life-of-mine to beyond 30 years and that it provided early access to additional higher-grade Merensky and UG2 reef.

Northam's board of directors approved the R4.20-billion development of the initial phase of the Booysendal South project – a significant growth project for the group that will add 240 000 oz/y of PGM output to the group's production profile – in June 2016. The project will entail the development of two UG2 mining modules and one Merensky mining module. The project is expected to reach steady state by 2022.

Meanwhile, by February 2017, the construction of a second 20 MW furnace at the Zondereinde smelter, being built at a cost of R750-million, was progressing well and on schedule for commissioning by the end of the 2017 calendar year. The project is expected to raise Northam's processing capacity to above one-million PGM ounces.

In addition to its brownfield growth opportunities, Northam also seeks acquisitive growth opportunities and, in February 2017, announced the acquisition of the Eland mine, near Brits, North West, from diversified major Glencore for R175-million. The acquisition includes Eland's two mining rights, with a resource estimated at 21.30-million ounces of 3PGE + Au; the surface and underground infrastructure, including a 250 000 t/m concentrator, a chrome spiral recovery plant, a 100-million-tonne tailings storage facility and two decline systems; and a mining fleet of more than 100 vehicles, including some low-profile mechanised mining equipment. Northam indicated that it would use some of the mining fleet at the Booysendal South project.

In addition, Northam also signed an exclusive chrome marketing agreement with Glencore, which will sell any chrome produced at Northam's PGM operations.

Royal Bafokeng Platinum

Royal Bafokeng Platinum		
CEO Steve Phiri/Chairperson Kgomotso Moroka		
	Year ended December 2016	Year ended December 2015
Revenue	R3.34-billion	R3.04-billion
Profit/(loss) for the year	R262.70-million	(R3.77-billion)
Headline earnings/(loss)	R166.70-million	(R159.60-million)
Platinum metal in concentrate	196 000 oz	180 000 oz

Royal Bafokeng Platinum (RBPlat) is a JSE-listed black-owned midtier PGMs producer. It was formed through the establishment of the Bafokeng Rasimone Platinum Mine (BRPM) JV between Amplats and Royal Bafokeng Holdings, the investment vehicle of the Royal Bafokeng Nation in 2002. RBPlat operates the BRPM, in the North West, and is building the Styldrift I project, a mechanised underground mine that will produce about 230 000 t/m of ore, in the same province.

RBPlat has described 2016 as a year of "unprecedented uncertainty and disappointing economic conditions"; however, the company swung to a net profit of R262.70-million in the year ended December 31, 2016, compared with the net loss of R3.77-billion recorded for the 2015 financial year. It also reported headline earnings of R166.70-million for 2016, from a headline loss of R159.60-million in 2015. It attributed the improvement in profitability to higher revenue, which was achieved on the back of a higher realised average rand basket price and higher platinum production at BRPM. RBPlat's platinum-in-concentrate output increased to 196 000 oz in 2016, from 180 000 oz the year before.

Meanwhile, RBPlat's capex decreased by 44% year-on-year to R1.13-billion in 2016, in line with plans announced in late 2015 to scale back on expenditure, owing to depressed market conditions. In line with a revised mining and construction plan for Styldrift I aimed at funding more of the work from surplus cash generated by BRPM and Styldrift I on-reef development revenue receipts, about 74% of the capex invested in 2016 was self-funded, compared with 30% of capex that was funded from cash generated by operations in 2015.

The revised mining plan focused on the development of key shaft infrastructure on the 600, 642 and 708 levels and the decline clusters to the north and south on the 600 and 642 levels. This was aimed at producing 50 000 t/m of ore and RBPlat reported in February 2017 that the infrastructure had achieved peak production capacity of 63 000 t in August 2016.

To handle the increasing mining volumes delivered by Styldrift, RBPlat has upgraded the BRPM treatment plant capacity to 250 000 t/m.

RBPlat reported in February 2017 that the progress made at Styldrift I and the increase in the rand basket price had enabled the company to commit to the next phase of expansion, which will result in the mine's ramping up to 150 000 t/m by the end of 2018. This expansion will cost an estimated R4.75-billion to execute.

The final phase to increase production further to 230 000 t/m remains deferred.

The overall capital cost to implement Styldrift I has risen to R11.01-billion, as a result of higher fixed overhead costs accrued because of the scaling down of operations; a cost-plus contracting strategy entered into with the main shaft sinking contractor Shaft Sinkers in 2015; changes in mine design and the implementation of new technology; and increased trackless fleet purchase costs owing to the weakening rand against the euro in recent years.

Styldrift mine surface operations

Picture by RBplat

Meanwhile, another growth project, the North Shaft Phase III replacement project, which will extend the North Shaft Merensky decline system from 10 level to the mining boundary at 15 level, was 94% complete at the end of 2016. Only the 14 and 15 level construction-related scope, which has been deferred to 2017, is outstanding. RBPlat invested R44-million in capex on the project during 2016, taking overall capex spent at the project, to date, to nearly R1.04-billion.

RBPlat expects to invest about R3.20-billion in capex during 2017, with the majority of the funds to be spent at Styldrift I.

Sedibelo Platinum Mines

Sedibelo Platinum Mines (SPM) is a PGMs miner with assets in the Bushveld Complex. Brian Gilbertson's Pallinghurst Resources holds a 6.54% indirect interest in SPM.

The main asset, the Pilansberg Platinum Mines, includes the West and East pits on the western limb of the Bushveld Complex.

SPM produced 165 000 oz of 4E in 2016. Pallinghurst reported in March 2017 that, although output for the year had been lower than the 176 014 oz produced the year before, production levels were optimal in light of continued depressed PGM prices.

During 2016, a bankable feasibility study was completed for its Kell technology, which Gilbertson has said could become "an industry-transforming" beneficiation process. The hydrometallurgical PGM extraction technology is expected to replace expensive, electrically powered smelting, leading to potentially higher PGM recoveries and lower operational expenditures.

Pallinghurst reported in March 2017 that SPM and its partners, the Industrial Development Corporation and Lifezone, were considering the establishment of the first Kell PGM beneficiation plant in Southern Africa.

Siyanda Resources

Black-owned company Siyanda Resources, which holds an interest in various commodities, has acquired Amplats' Union mine, as well as its 50.1% stake in Masa

Chrome Company, in which Siyanda holds the remaining interest, for R400-million, as well as up to R6-billion in deferred annual payments of 35% of cumulative free cash flow over ten years.

Business Day quoted Siyanda business development executive Imraan Osman in February 2017 as saying that Masa Chrome Company was a value-accretive business, while the Union mine had been restored to profitability and could be developed further to extract further value.

Sylvania Platinum

Sylvania Platinum		
CEO Terence McConnachie/Chairperson Stuart Murray		
	Year ended June 2016	Year ended June 2015
Revenue	$39.51-million	$47.79-million
Profit/(loss)	$3.73-million	$1.70-million
PGM production	60 643 oz	57 587 oz
	Six months ended December 2016	Six months ended December 2015
Revenue	$24.55-million	$18.53-million
Profit/(loss)	$4.52-million	$281 022
PGM production	35 819 oz	29 519 oz

Sylvania Platinum is listed on the Aim market of the London Stock Exchange and produces PGMs through the retreatment of PGM-rich chrome tailings material sourced from mines in South Africa's Bushveld Complex.

The company's assets include the Sylvania Dump Operations, which comprise seven PGM recovery plants. The Milsell, Mooinooi Dump and Mooinooi Run-of-Mine plants are located on the western limb of the Bushveld Complex, while the Lannex, Steelpoort, Doonbosch and Tweefontein plants are located on the eastern limb. Sylvania also owns a 25% interest in the Chrome Tailings Retreatment Plant (CTRP), which was formerly managed by Aquarius Platinum, but placed on care and maintenance.

Its Northern Limb projects comprise four exploration targets and three shallow mining and exploration projects – Grasvally, Volspruit and Everest North. Given the difficult market conditions in recent years, Sylvania decided to focus on its dump reprocessing operations instead of exploration. The company reported in its annual report for 2016, published in October, that there was "insufficient tangible" improvements in the market to warrant exploration for PGMs or chromite and that the company would consider selling or spinning out its Grasvally chrome project.

Meanwhile, the company produced a record 60 643 oz of 3E+Au PGMs in the 2016 financial year to June 30, 2016, a 5% increase on the 57 587 oz produced in the prior financial year and well above the guided 57 000 oz to 58 000 oz for the year. The company expects to maintain production at above 60 000 oz/y and produced 35 819 oz in the first half of the 2017 financial year. Production guidance for the 2017 financial year has been set at 63 000 oz to 65 000 oz of PGMs.

Following criticism about its finite production profile, Sylvania undertook a year-long strategic review of its Sylvania Dump Operations (SDO) plants and discovered an opportunity to maintain production at about 60 000 oz/y, but also to extend the lifespan of the operations. The company in August 2016 introduced shareholders to Project ECHO, which is aimed at improving PGM recovery efficiencies by adding secondary milling and flotation (MF2) modules to existing operations. The project will be rolled out over a two- to three-year time frame. Sylvania explained that treating tailings from a single-stage milling and flotation (MF1) operation for a second time, where grade allows, will recover more PGMs from the primary process while

Technology showcase

Economic Development Minister Ebrahim Patel highlighted in Parliament in April 2017 developments around a new platinum group metals processing that been developed in collaboration with diversified miner Pallinghurst and the Industrial Development Corporation.

The new Kell concentrate-to-refined metals plant reduces mining-to-refining time to a week instead of more than a month, uses less than a fifth of the electricity needed for smelting, replaces a smelting plant that costs $1-billion with a modular hydrometallurgical plant that costs $100-million, widens mining scope by throwing chrome-ore content caution to the wind, adds tens of millions of dollars to the revenue stream by recovering the cobalt metal that smelting obliterates and eliminates all pungent and toxic sulphur dioxide emissions that smelting causes.

Being modular, additional plant capacity can be phased in, allowing capital to be spent over an extended period of time instead of all at once.

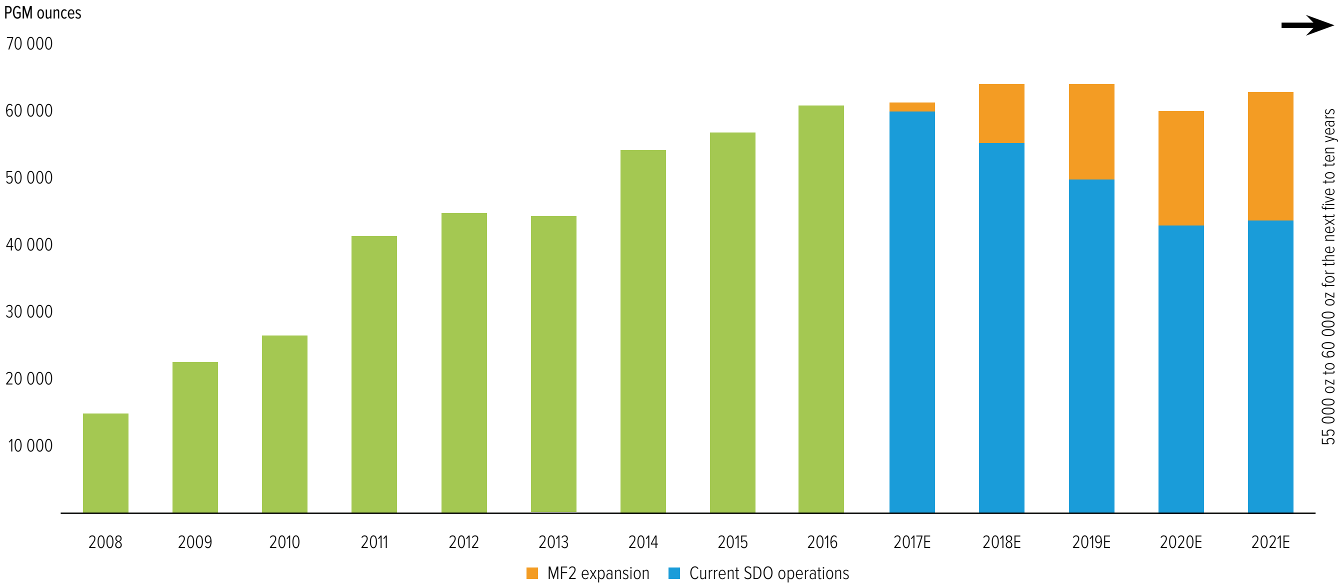
The elements used by the Kell plants are available off-the-shelf, with the intellectual property residing in their configuration.

A Kell plant can be put together in a year and be commissioned in 18 months.

Further, a slightly modified Kell is also capable of reprocessing recycled platinum.

Source: *Mining Weekly*

Sylvania SDO production profile



Source: Sylvania Platinum
E – estimated

lowering the initial capital requirement for processing plants. Project ECHO will entail the transformation of the Millsell, Doornbosch, Tweefontein, Mooinooi Dumps and Mooinooi Run-of-Mine operations from MF1 circuits to primary and MF2 circuits.

Sylvania reported in February 2017 that Project ECHO had started construction in the six months to December 31, 2016, and that it would add ten years of sustainable production to the company's profile. As a result of the project getting under way, SDO capex increased by 17% year-on-year to $840 000 for the six months to December 2016.

Meanwhile, Sylvania's revenue decreased by 17% year-on-year to $39.50-million in the 2016 financial year, owing to the gross PGM basket price having decreased by 21% to $850/oz, from $1 072/oz in the prior financial year. An increase in the gross basket price for PGMs once again contributed to a rise in revenue, of 32%, for the six months to December 2016.

Tharisa

Cyprus-headquartered Tharisa owns and operates the eponymous Tharisa mine, a shallow, large-scale openpit PGMs and chrome mine near Rustenburg, in the North West. Production at the openpit mine started in 2009 and is expected to continue until 2038. Tharisa, however, plans to start the transition to underground mining in 2032.

Tharisa also operates two processing plants – the 100 000 t/m Genesis plant and the 300 000 t/m Voyager plant – which produce PGM and chrome concentrates respectively.

For the financial year to September 30, 2016, the company achieved a net profit of $15.80-million, more than double the $6-million achieved in the 2015 financial year. PGM production for the year reached 132 600 oz while chrome concentrate production totalled 1.20-million tonnes.

Tharisa expects to produce 147 000 oz of PGMs and 1.30-million tonnes of chrome concentrates in the 2017 financial year.

In April 2017, the company announced that the mine would become owner-operated, with Tharisa taking over the employees and equipment of contractor MCC at its mine. This is expected to result in cost and operational benefits.

As part of the progression to owner-operated mining, Tharisa in May 2017 entered into a term sheet with MCC to buy certain equipment, including 160 'yellow fleet' machines such as excavators, off-highway dump trucks, articulated dump trucks and support vehicles; strategic components; site infrastructure; and spare parts at the Tharisa mine for R303.30-million. The agreement includes the transfer of about 900 employees currently deployed at the mine.

Exploration and development companies

Bauba Platinum is a JSE-listed platinum exploration and chrome ore production company. In line with South Africa's transformation objectives, it has partnered with the Bauba Nation, which owns a 40% interest in the Bauba platinum project and the Bauba chrome ore operation.

Bauba holds PGM prospecting rights over eight properties on the eastern limb of the Bushveld Complex and has declared an inferred resource of about 17.22-million ounces.

Bauba has in recent years been using funds generated by its chrome ore operation, comprising two farms – Moeijelijk 412 KS and Waterkop 113 KT – to finance its platinum exploration activities, but this came to a temporary halt in January 2016 when it suspended operations at the opencast Moeijelijk chrome mine as a result of low prices.

In June 2016, the Department of Mineral Resources (DMR) granted a 20-year mining right for chrome on farm Moeijelijk 412 KS, which will allow for mining operations to continue beyond what was permitted under a previous small-scale mining permit issued in November 2014. At the time, the company revealed it is considering the potential of starting underground mining of chrome at Moeijelijk, in parallel with opencast operations. Underground mining will be at about 30 000 t/m, with production to start at the end of the 2018 financial year. The company reported in March 2017 that first development of the underground mine, which will be built at a cost of R24.50-million, would start at the end of that month.

Meanwhile, in January 2017, with chrome prices having recovered sufficiently – from a low of $80/t in 2016 to $380/t in early 2017 – chrome mining at the Moeijelijk mine restarted. The mine is expected to ramp up to about 20 000 t/m of chrome ore production within three months of operations resuming. Bauba reported in February 2017 that it was making good progress on ramping up output, with an estimated 12 000 t of chrome ore produced in January.

The Department of Water and Sanitation granted Bauba a 20-year water use licence (WUL) for Moeijelijk in April 2017. The mine previously relied on a general authorisation for water use and the WUL will enable chrome mining operations to expand.

Meanwhile, in 2016, Bauba Platinum welcomed a new CEO and FD. Nick van der Hoven took over as CEO of the company, following the resignation of Syd Caddy in May 2016. In October 2016, the company also appointed Jonathan Knowlden to succeed former FD Carl-Heinz Gernandt, who had resigned because of personal reasons.

Canadian exploration company **Ivanhoe Mines** owns 64% of Ivanplats, which, in turn, holds the Platreef PGMs, nickel, copper and gold mine, in South Africa's Limpopo province. Empowerment partners, including 20 host communities, project employees and local entrepreneurs, own a further 26% stake in Ivanplats, while the balance is owned by a Japanese consortium, comprising Itochu Corporation, ITC Platinum, Japan Oil, Gas and Metals National Corporation (Jogmec) and JGC Corporation.

Since 2007, the focus of exploration work at the Platreef project has been on the Flatreef deposit, which is amenable to mechanised underground mining methods. A May 2016 mineral resources estimate showed that, at a base case cutoff grade of 2 g/t, the indicated mineral resources contain 42-million ounces of PGMs plus gold, with a further 52.80-million ounces in the inferred category. At a cutoff grade of 1 g/t, the indicated mineral resources contain about 58.8-million ounces of PGMs plus gold in addition to 94.30-million ounces in inferred resources.

The results of a prefeasibility study (PFS), published in January 2015, outlined plans to develop the Platreef project in three phases, the first of which would have

Platreef mine

Picture by Ivanhoe Mines

a production rate of four-million tonnes a year to produce about 433 000 oz/y of platinum, palladium, rhodium and gold (4E). Production will be expanded to eight-million tonnes a year in Phase 2 and to 12-million tonnes a year in the third phase. Four vertical shafts will provide the main access to the Flatreef deposit, as well as ventilation, with shafts 1, 3 and 4 to be used for ventilation to the underground workings.

In July 2016, Ivanhoe reported that contractor Aveng Mining had started permanent sinking work on the 7.25-m-wide Shaft 1 at Platreef, which would provide initial access for early underground development at the Flatreef deposit. Shaft 1 will be sunk to a depth of 1 025 m below surface by 2018. By the end of March 2017, the shaft had been sunk to a depth of more than 283 m below surface, with work progressing at a rate of about 45 m a month.

In November 2016, the company revealed that Murray & Roberts Cementation had completed the design of Shaft 2, which will be the project's main production shaft, with a 10 m internal diameter and a hoisting capacity of about six-million tonnes a year. Ivanhoe expects early works, including civil works for the boxcut and hitch foundation, to start at Shaft 2 in 2017.

Meanwhile, Ivanplats was given the go-ahead in February 2017 to continue with the relocation of informal graves located in the vicinity of the Platreef project. The North Gauteng High Court, in November 2016, had issued an interdict to prevent the relocation. Ivanplats, however, successfully argued in court that it had held extensive consultation with affected parties and that it had obtained the required permits and authorisations.

Jubilee Platinum is a platinum-focused mining and exploration company that is listed on the Aim of the LSE and the JSE's AltX. It holds a 63% stake in the Tjate project, which covers about 5 140 ha on the eastern limb of the Bushveld Complex and contains a potential 65-million ounces of platinum-group elements (PGEs) and gold. Jubilee holds the exclusive rights to smelt high chrome-bearing platinum concentrates using the ConRoast process. The company believes ConRoast will enhance Tjate's project value by an estimated $500-million over 20 years. The company had submitted a mining right application to the DMR in June 2011, but by December 2016, the mining right had not yet been granted.

Jubilee has, however, made considerable progress at its two tailings projects, which it plans to ramp up to produce about 36 000 oz/y of PGE and gold in concentrate. It commissioned its 35 000 t/m ASA Metals chrome processing plant in February 2016 and produced the first chromite at its 55 000 t/m Hernic tailings plant in February 2017. Jubilee is also considering acquiring further surface or shallow platinum-bearing operations.

In March 2017, it signed an agreement with PlatCro for the acquisition of new 4E PGM-bearing surface material at PlatCro's property, which is within trucking distance of the Hernic plant, where the material will be processed.

Nkwe Platinum, in which Chinese firm Zijin Mining owns about 60%, is focused on developing its Garatau platinum project, which comprises three properties on the eastern limb of the Bushveld Complex. The project has an estimated resource of 43.69-million ounces of 3 PGE + Au.

A bankable feasibility study completed in 2012 had estimated the project could produce about 330 000 oz/y of platinum over an initial 17-year mine life. At one stage, Nkwe had expected the mine to be in production by 2015, but by early 2017, it was still awaiting approval of certain regulatory processes. At the end of January 2017, the company reported in a quarterly activities report for the three months ended December 31, 2016, that a record of decision on a water use licence for the project was still pending, as was a budget quote from power utility Eskom for the supply of grid power to the mine.

The company further revealed that it had received notice from the DMR of its intention to cancel Nkwe's mining right over one of the properties included in the Garatau project area, owing to Nkwe's alleged failure to meet certain provisions of the Mineral and Petroleum Resources Development Act. In response to the notice, the company had delivered a presentation to a DMR official in late December 2016 and was awaiting a final decision.

Platinum Group Metals (PTM) is a Canadian company focused on the development of two platinum group metals (PGMs) projects in South Africa – the Maseve mine, in the North West, which was commissioned in April 2016, and the Waterberg project, in Limpopo.

Construction on PTM's 83%-owned Maseve mine, formerly called the Western Bushveld Joint Venture Project 1, started in 2011. The mine, which will extract and process PGMs and associated minerals from the Merensky and upper group two reefs, is currently in the ramp-up phase of production. However, throughout 2016 PTM had to deal with delays in ramp-up, owing mainly to poor contractor performance that resulted in the late completion of underground infrastructure and bottlenecks in transporting ore out of the mine. PTM reported in November 2016 that various Section 54 safety stoppages by the DMR had further hampered the ramp-up in production. The company revealed in January 2017 that production for the year was likely to reach 100 000 oz to 120 000 oz of 4E, after it had introduced changes in terms of mining contractors. Redpath Mining South Africa, which is a subsidiary of Canadian firm Redpath Mining Contractors and Engineers, has become the principal mining contractor at Maseve and has been mining Blocks 9 and 12 at the mine.

Redpath also won the tender to provide bord-and-pillar mining and hybrid mechanised mining at Block 11, on which PTM was focusing its development activities. Redpath will also take responsibility for transporting ore from Block 11 and has entered into a letter of intent with PTM to install, operate and maintain a 1 km conveyor towards Block 11, which links into underground silos, the existing 1.4 km conveyor to surface and a 1.7 km conveyor system into the mill. The conveyor is expected to cost R25-million to develop. Redpath is also expected to set up for mining in Block 16 early in 2017.

PTM lowered the full-year production guidance for Maseve to 85 000 oz of 4E, in April 2017, after production volumes had been negatively impacted on by the change in underground mining contractor, senior management changes, equipment operator performance and improving equipment availability in January and February.

PTM is targeting positive cash flow at Maseve in the first half of 2017 and, in January 2017, said it would need to source C$5-million to C$15-million in additional funding to achieve that goal and maintain its working capital covenants under existing loan facilities. In January 2017, it reached an agreement with a syndicate of underwriters, led by BMO Capital Markets, to raise $25-million.

In April 2017, PTM entered into another financing agreement with BMO – a $20-million bought deal financing, with the proceeds to be used for underground development and production ramp-up at Maseve, for working capital and for repaying $2.5-million owed to a syndicate of lenders led by Sprott Resources Lending Partnership.

Meanwhile, PTM has completed a PFS on the Waterberg project, in which it holds a 45.65% stake. The balance is held by Jogmec, with a 28.35% interest, and empowerment partner Mnombo Wethu Consultants, with a 26% interest. PTM in October 2016 published the highlights of a PFS on the project, which showed that about $1.06-billion would need to be invested in building the mine over a three-and-a-half-year construction period. The mine is estimated to produce about 744 000 4E ounces in concentrate a year, and 23-million pounds of nickel and copper a year once the project reaches steady state. The Waterberg project has been designed as a low-cost multidecline and fully mechanised mine with two 300 000 t/m mills. PTM plans to continue with a feasibility study on the project and the submission of a mining right application, during 2017.

Wesizwe Platinum is a JSE-listed platinum development company that is 45%-owned by a consortium comprising China's Jinchuan Group and the China Africa Development Fund. Its flagship project, the Bakubung Platinum Mine, near Rustenburg, in the North West, is being developed at a cost of about R10.69-billion and will comprise an underground mine with a twin vertical shaft system and a process plant. It is expected to produce about 420 000 oz/y of 4E at steady state, which is expected to be reached in 2021.

Mine development started in July 2011. In March 2017, the company reported that the production shaft had been equipped to shaft bottom. Process plant construction is also expected to get under way during 2017, while all surface infrastructure is to be completed in the same year.

In a mutual agreement with shaft-sinking contractor Aveng Mining in September 2016, Wesizwe announced the early termination of Aveng's contract at Bakubung, as the Phase 1 main shaft commissioning would be completed in May 2017 and not in September 2017 as initially planned, owing to the scope of works having been reduced.

Wesizwe has also decided to appoint contract miners to operate the mine. During an October 2016 press conference, Wesizwe projects executive Jacob Mothomogolo said the company would use two contract mining firms for the first five years of the mine's life and would, thereafter, review whether to move to owner-operated mining. The company highlighted that mine development projects were sensitive to delays in the first few years and that contract mining generally yielded a better performance during the early years of a project.

Wesizwe also holds a 17.1% interest in Maseve Investments' Projects 1 and 3, which is majority-owned by PTM. The company has also had two recent management changes, with former FD Wenliang Ma having resigned from his position in September 2016. Wesizwe announced in February 2017 that its CEO Jianke Gao had also stepped down and would be succeeded by Zhimin Li.

Outlook

After four years of price weakness, platinum prices started to rise during 2016 and some analysts believe that the price has reached a trough and that the future outlook for platinum prices is more positive, owing to improvements in the global economy.

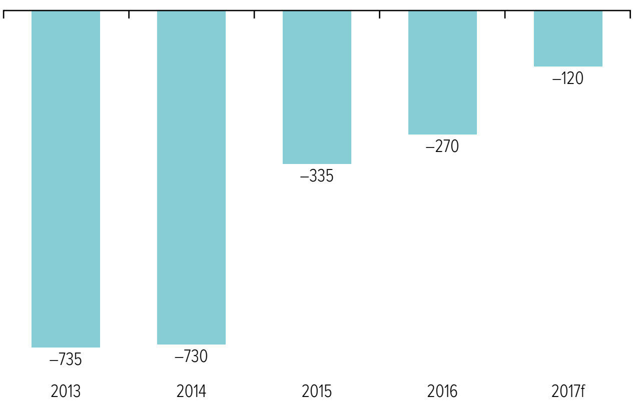
However, they warn that the recovery will be slow, given the slow economic recovery in the Eurozone and China, and that this is likely to impact on South African platinum miners' share price performance. Miningmx reported in April 2017 that further restructuring in South Africa's mines would likely be needed to ensure that miners could cover operating costs and capital expenditure.

Bank of America Merrill Lynch is forecasting that platinum will trade at about $1 050/oz in 2017. It has criticised South African miners for not showing restraint in cutting back on production amid a supply overhang and has indicated that platinum prices will rebound if the market reduces output by 300 000 oz to 400 000 oz. Lonmin CEO and COO Ben Magara agrees, telling *Mining Weekly* in April 2017 that the platinum price demonstrated that the market was in oversupply and that cuts were needed.

Mining Weekly also reported in the same month that advisory firm CPM Group expected the platinum price to continue decreasing amid lower demand and a rising surplus.

By early May 2017, the platinum price fell to a new low of $893/oz, putting the industry at risk, given the high costs faced by miners. *Mining Weekly* reported at the time that platinum had reached its lowest price ratio to gold since 1987.

Supply-demand balance, '000 oz, 2013 to 2017[f]



Source: SFA Oxford/WPIC
f – forecast

Bloomberg also reported that some industry analysts were also forecasting platinum prices to drop below that of sister metal palladium for the first time in 15 years.

The World Platinum Investment Council (WPIC), meanwhile, expects the platinum market to end with a deficit of 65 000 oz in 2017, as platinum supply is expected to fall by 2% year-on-year to 7.73-million ounces and demand by 6% year-on-year to 7.80-million ounces.

Refined production is anticipated to decrease by 1% year-on-year to 5.96-million ounces, with all regions to register a drop in refined output. South Africa and Zimbabwe are likely to make the biggest contributions to the overall decrease, with expectations that output will be 1% and 7% lower year-on-year respectively. Supply from North America is expected to decrease by 2% year-on-year, while supply from Russia is expected to be flat on that of 2016.

Mining supply is expected to fall by 3% year-on-year to 5.90-million ounces, while secondary supply is likely to fall by 6% year-on-year to 1.76-million ounces. The WPIC explains that the decrease will be driven by a 20% year-on-year decrease in platinum jewellery recycling. It should be noted that China contributed an "unusually high" amount of platinum jewellery recycling in 2016 as excess stock was recycled. This is unlikely to be repeated in 2017.

Recycling of platinum from spent autocatalysts will increase by about 2% year-on-year to about 1.26-million ounces in 2017, as a result of higher scrap steel prices.

On the demand side, the WPIC expects demand from the all-important automotive industry to remain flat at 3.39-million ounces in 2017, with car sales growth in Europe expected to slow amid uncertainties over the UK's exit from the European Union and the recently held national elections in the Netherlands and France, with elections in Germany to follow.

Demand from the jewellery sector is expected to decrease by 1% year-on-year to 2.53-million ounces, on the back of weaker demand in China outweighing stronger demand in India, North America and Europe.

Industrial platinum demand will fall by about 9% year-on-year to 1.61-million ounces in 2017, mainly as a result of a decrease in demand from the petroleum refining sector, but also owing to lower demand from the glass fabrication and electrical components sectors.

Investment demand is, meanwhile, forecast to decrease dramatically by 50% year-on-year to 250 000 oz, as a result of higher prices that are hampering Japanese bar purchases, as well as limited growth in exchange-traded fund holdings.

Amid lower demand, Anglo American Platinum (Amplats) has been particularly active in marketing the use of platinum in existing or near-term applications, as well as developing markets for longer-term growth areas, including fuel cells, hydrogen and clean energy.

Mechanisation will also remain a key thrust for South African platinum miners, including Amplats, which is aiming to produce 80% of its platinum through mechanised mining by 2027. The company is placing particular emphasis on remote-controlled and automated machines as a means to remove mineworkers from high-risk areas and ensure their health and safety.

Picture by Anglo Platinum

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