
# NATIONAL PLATINUM STRATEGY

for South Africa

MINERALS COUNCIL
SOUTH AFRICA

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# EXECUTIVE SUMMARY

The South African platinum group metals (PGM) mining industry is in crisis. One of the many factors that have contributed to the current status is the absence of a South African National Platinum Strategy.

This report presents a draft strategy that, if adopted, could address the current crisis, prevent further erosion of the economic capacity of the PGM mining industry and ensure that the world's largest PGM resource realises its full value through the addition of more than 1 million jobs and a contribution of R8.2 trillion to South Africa's economy by 2050.

The economic, taxation, investment, employment and transformational impact of a realisation of the platinum industry's potential would be materially game changing for South Africa in that it achieves the objectives and vision of the National Development Plan.

Urgent and bold action by the South African government is required to provide the PGM mining industry with the support that it needs to tackle the short-term challenges while at the same time investing in the long-term future. Concerted and co-ordinated effort by the public and private sector, supported by the framework of a national strategy, is essential to enhance the short-term and prevent the long-term opportunity from being squandered.

**"1 MILLION JOBS** and **8.2 TRILLION RAND** to South Africa's economy by 2050"

# BACKGROUND TO THE CURRENT CRISIS

In 2006 the PGM mining industry in South Africa employed over 200 000 people and produced 9.9 million ounces of PGMs valued at R65 billion (US$9.6 billion). Mining industry margins were typically above 30% and capital expenditure was nearly R20 billion (US$3 billion).

Ten years later in 2016, employee numbers were at 188 000 and PGM production was 8.5 million ounces valued at R96.5 billion (US$6.6 billion). However, mining company margins are on average negative, the industry has made an aggregate loss and capital expenditure was below R10 billion (US$0.7 billion). Simply stated, the very viability of the platinum mining industry is under serious stress. All the significant financial indicators (return on assets, return on investment, gearing etc., have deteriorated significantly).

One of the key causes of the significant change in status of the industry has been the fall in PGM prices traded on global markets, something that has been caused by a number of structural changes to supply and demand for these metals. Recycling has grown as a percentage of overall PGM supply from 14% in 2006 to 34% in 2016, alongside flat mine production. Platinum has been replaced by palladium in catalytic converters fitted to gasoline cars, resulting in a weakening of platinum demand and rhodium has been partially removed from automotive catalyst systems following its price spike in 2008.

The industry is now facing further structural changes. Chinese jewellery demand has weakened in the last few years as the economy there has slowed. The diesel emissions scandal is having a notable negative impact on sales of diesel cars in Europe and the accompanying demand for platinum. Looking further ahead, the possibility that battery electric cars, which contain no PGMs, could capture significant market share from the internal combustion engine, may potentially destroy some existing demand. At the same time, recoveries of the PGMs through recycling continue to increase.

**In this environment, a failure to invest appropriately in market development has the potential to lead to lower PGM demand and a smaller South African PGM mining sector.**

These structural changes have resulted in continued downward pressure on prices. While the fall in dollar platinum prices was partially offset by a weakening rand against the dollar, escalating cost increases above inflation (especially those related to electricity and labour costs) have eroded producer margins, with many mines operating at a loss. At current prices and costs, over 60% of South Africa's platinum mining industry is loss-making.

The PGM mining industry has taken numerous difficult steps over the past 10 years to address the short-term consequences of declining viability. The industry has gone through bouts of restructuring, including asset consolidation, has closed some marginal shafts and reduced employment numbers. However, many actions that address the short-term challenges have harmed the ability to generate the highest value to South Africa over the longer term. For example, the reductions in capital spending on long-term shafts have harmed the development of replacement shafts that are required in the medium- to long-term.

# WHY THE LONG-TERM OPPORTUNITY JUSTIFIES BOLD SHORT-TERM ACTION

To date, the South African economy has benefited significantly from PGM mining. Between 1980 and 2015 the industry produced 221 million ounces of PGMs valued at R1.2 trillion (US$170 billion). Profits from the sale of PGMs were distributed to multiple stakeholders, including taxes and royalties to the National Treasury, principally across the South African economy over that 35-year period.

The scenarios presented on Page 8 show that at the current industry trajectory, the PGM industry would generate revenues of US$11 billion in 2050. A strong PGM mining industry, actively investing in market development and supported by government to ensure that the platinum price reflects platinum's value in use, could generate revenue of US$35 billion in 2050. The benefit of significantly higher revenues, and the knock-on potential of sharing of an additional US$23 billion to the South African economy, is underappreciated by the industry's current stakeholders.

The benefit to South Africa of securing this opportunity is a national treasure that could unknowingly be squandered if the status quo is perpetuated. The invaluable nature of this opportunity is worthy of the urgent implementation of a National Platinum Strategy, as outlined in this document.

## In 2017

| Direct employees | Platinum produced |
|---|---|
| 175,770 people | 253t |
| **Employee earnings** | **Total sales** |
| R48.0bn | R94.1bn |
| **Royalties paid** | **Percentage of metals exported** |
| R0.8bn | 87% |


The fundamental opportunity is centred on the key theme that additional demand for PGMs is required. Given that South Africa is the world's largest producer of platinum, it is of particular importance for the various South African stakeholders to create additional platinum demand on a global scale. The underlying basis of creating that demand is the concept of promotion of demand, such as the active promotion of platinum as a key store of value and an investment product. The higher the level of promotion, the higher the physical offtake and the more economic benefits the South African government, economy and people would receive. Just achieving 10% of the success achieved by the gold Krugerrand through a similar platinum rand would create 5 million ounces of demand over time – a game changer for the country. At the same time, promotion must also aim at growing demand into other sectors (such as investment, industrial, and jewellery.

# SUMMARY OF ACTION STEPS REQUIRED

To demonstrate the importance of the National Platinum Strategy and to align all stakeholders, bold and clear actions will be required including:

- Agreement on the critical need to promote platinum and to increase demand on a global scale.
- Agreement by government, the platinum mining industry and other key stakeholders (labour and fabricators) on the critical need to develop and implement a proper National Platinum Strategy for South Africa.
- The establishment of a leadership public-private steering committee, the urgent announcement of the National Platinum Strategy and the actions that will be taken to support it and implement it to secure an economy changing future.
- The identification of five key areas that the National Platinum Strategy should focus on, including, among others:
  - A commitment from government to match funding by the PGM industry on market development in jewellery, investment and fuel cells.
  - A national platinum reserve asset strategy (South African Reserve Bank supporting the World Platinum Investment Council (WPIC) in its engagements with the International Monetary Fund and BRICS countries to ensure platinum is adopted as a reserve asset).
  - A national strategy to drive investment demand for platinum.
  - A national platinum fuel cell strategy (to boost the hydrogen economy).
  - Immediate measures to assist the platinum mining industry to improve its viability and preserve employment.
- The development of a Milestone Plan to ensure the effective implementation of the National Platinum Strategy.

# The aims of the National Platinum strategy:

- **Take short-term action** to secure the ongoing viability of current PGM mining. The best way to do this is to leverage the opportunities to promote platinum and create demand.
- **Implement collective action** by all public and private stakeholders to capture the long-term platinum opportunities.
- **Ensuring that the global market is given the assurance** of continuity and stability in platinum supply from South Africa.
- **Maintain alignment** with the long-term intent when short-term decisions are made.
- **Publish short-term successes** to enhance alignment of the public-private initiative.
- **Use the strategy as a template** for other national interventions.

### Establishing the strategy

Establish a leadership-driven public-private steering committee which will include the necessary government departments and the industry leadership to ensure the full magnitude of the opportunity is agreed by all and that actions taken match the opportunity.

Develop a strategy document that is clear and succinct that can be published by the steering committee to provide the rationale and motivation necessary to implement bold initial action.

Urgently commission global strategy experts to develop the national strategy to achieve the above in line with global best practice.

## The essence of the strategy would:

**Identify key "Leadership Champions" among stakeholders to populate the public-private steering committee to drive the vision, process and implementation of the strategy.**

**Develop strong and focused partnerships between key stakeholders and role players, including all relevant government departments.**

**Identify the opportunities for short-term interventions aligned with long-term strategic goals, including market development in all platinum and PGM demand segments and a specific focus on fuel cell electric vehicle market share growth.**

# ABOUT PLATINUM GROUP METALS

## Introduction

Platinum group metals (PGMs) are noble metals vital to the world.

They play a critical role in reducing poisonous gas emissions from vehicles, are key to industrial processes, are a clean source of electric and automotive power, are key to unlocking the hydrogen economy, play a significant role as adornment and as a store of value in jewellery and investment. South Africa is blessed with the world's greatest PGM resource endowment, with more than 80% of the world's known reserves and resources.

The South African PGM mining industry has emerged as one of the largest components of the mining sector, as the largest employer (188,078 people), a significant export revenue earner (R90 billion) and with a significant development, investment and transformation footprint on the economy. The sector has struggled in the past five years with an oversupplied market, domestic labour strife, declining productivity and rapidly escalating costs, and unfortunately the situation is worsening. At current prices, more than 60% of the platinum mining industry is loss-making or marginal.

However, what is the real economic and transformational potential of South Africa's incredible PGM resource endowment? Is this as good as it gets? Or can the full potential be realised? The purpose of this draft strategy document is to begin the journey of understanding the massive potential of the platinum sector to enable South Africa to not only achieve the ideals contained in the National Development Plan's vision, but also to bring the resource endowment to account for the benefit and prosperity of all South Africans.

Through the use of three scenarios, the future journey is described. The "High Road" scenario could realise extra platinum production and sales of US$23 billion by 2050 and as opposed to the "bumble along" scenario, would be a total game changer for the economy.

In order to realise the High Road scenario, South African key stakeholders will need to adopt a National Platinum Strategy and form a strong cooperative partnership that, together with other key stakeholders (the main customers, the automotive sector, etc.), will jointly drive market development and innovation to a totally new level, thereby creating a global market for the product. This document highlights some of the key objectives of a National Platinum Strategy and is meant to stimulate debates on the next steps.

## PGMs – the noblest of metals

The PGMs are six noble, precious metallic elements which are crucial to our daily lives. From fountain pens to aircraft turbines, from anti-cancer drugs to mobile phones, from catalytic converters for automobiles to ceramic glazes, PGMs play a vital role at the heart of everyday living. One in four of the goods manufactured today either contain PGMs or had PGMs play a key role in their manufacture. However, despite the importance of these metals, overall demand depends heavily on a limited number of applications, principally in the jewellery and automotive sectors, exposing them to the risk of lower prices in a changing environment.

PGMs will also be central to our future choices in the fields of power generation, transportation, healthcare and a host of other areas. PGMs are a key component of unlocking the hydrogen economy and their use in fuel cells creates clean energy with electro chemical reactions and not combustion processes. Found together in nature and similar in their chemical properties, PGMs are located next to each other in the periodic table.

PGMs are uniquely durable and can be used extremely efficiently – meaning that a very little goes a very long way. When recycled, over 96% of PGMs are recovered through highly-efficient recycling techniques.

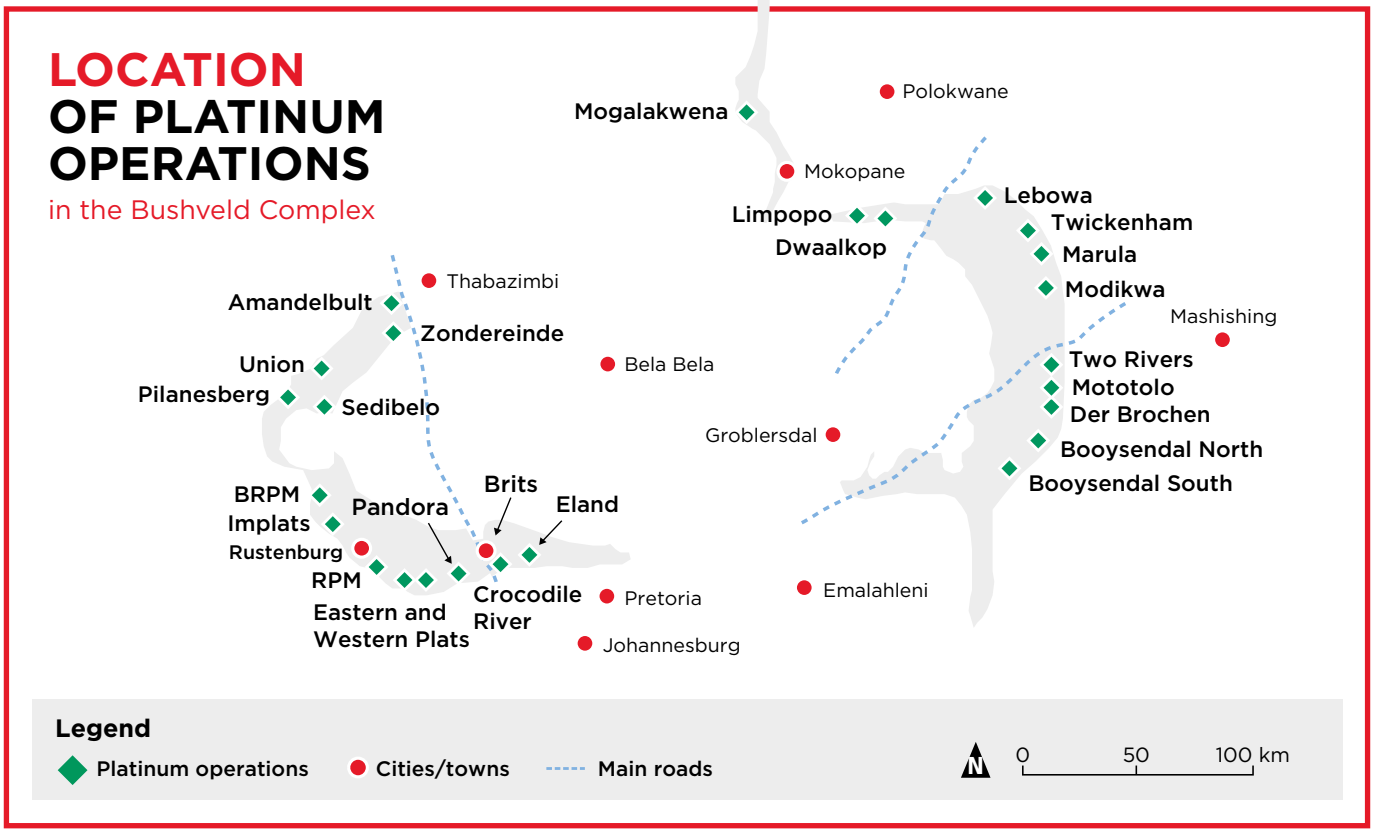
### PGM properties:

- are indispensable in many industrial applications
- are inert
- are very durable
- are highly resistant to wear, tarnish and chemical attack
- resist corrosion
- have excellent catalytic properties
- are highly recyclable
- are used rather than consumed
- have high electrical conductivity
- have high thermal resistance and stability
- have high melting points

### PGMs are used in:

- Catalytic converters. Autocatalysts are the largest demand sector for PGMs and in 2016 accounted for half of gross world demand for platinum, palladium and rhodium combined
- Computer hard disks, mobile phones, aircraft turbines, glass, nitric acid, silicones etc.
- Anti-cancer drugs, cardiac treatment, implants, dental applications
- Fuel cell technology. Power-train for electric cars: a fuel cell using a catalyst of platinum and ruthenium combines hydrogen with oxygen in a chemical reaction
- Jewellery and items for adornment
- Investment instruments and coins.

# SOUTH AFRICA'S PGM RESERVES AND RESOURCES




## Understanding South Africa's platinum resource base

The six PGMs – platinum, palladium, rhodium, osmium, ruthenium and iridium – occur together in nature alongside nickel and copper.

Platinum, palladium and rhodium, the most economically significant of the PGMs, are found in the largest quantities. The remaining PGMs are produced as co-products.

World platinum resources are estimated at over 100 million kilograms of which over 80% are located in South Africa. In terms of reserves, South Africa has 95% of the world's known PGM reserves of 66 million kilograms, with Russia, the USA, Canada and Zimbabwe making up the balance.

South Africa is the world's leading platinum and rhodium producer, and the second largest palladium producer after Russia. South Africa's production is sourced entirely from the Bushveld Igneous Complex, the largest known PGM resource in the world.

The Bushveld Complex formed some 2 billion years ago and is a large layered igneous intrusion within the earth's crust which has been tilted and eroded and now outcrops around what appears to be the edge of a great geological basin, the Transvaal Basin. Found in the northern part of South Africa, the igneous body hosts more than half the world's PGMs, and other associated minerals such as chromium, vanadium and refractory minerals.

The intrusion is divided into four limbs – the northern, southern, eastern and western limbs. The Bushveld Complex is made up of the Rustenburg Layered Suite, the Lebowa Granites and the Rooiberg Felsics. It is underlain by rocks from the Transvaal Supergroup and overlain by Karoo sediments.

The Rustenburg Layered Suite contains mainly mafic rocks and is divided into a number of different zones. The marginal zone is found around the edge of the intrusion, while from the base of the complex up is the Lower Zone, the Critical Zone, the Main Zone and lastly the Upper Zone. The chromitite seams in the Critical Zone are divided into the lower, the middle and the upper groups (UG), with the LG6, UG1 and UG2 being of greatest economic importance.

The Merensky Reef is found between the Critical and the Main Zone, and is rich in PGMs.

# PGM MINING IN SOUTH AFRICA

## History of platinum mining in South Africa

In South Africa the discovery of the first platinum nuggets dates back to 1924.

The geologist Hans Merensky's follow-up work resulted in the discovery of two deposits, each around 100 kilometres in length, which became known as the Bushveld Igneous Complex. This discovery started with test work in the area around Mashishing (formerly known as Lydenburg). Based on successive encouraging findings, Merensky approached a circle of friends to raise funds to investigate any payable platinum deposits. He used the farm Maandagshoek as a base and later secured 23 claims, and worked quickly to locate other platinum occurrences in the area. Merensky's work resulted in the naming of the Merensky Reef. In 1925 follow-up work resulted in the identification of the eastern limb of the Bushveld Complex. The mines on this geological structure have for many years produced more than 75% of the world's output.

Since World War II platinum mine production grew continuously in response to new applications being developed for the metals. A significant new use of platinum was in the petroleum industry, where platinum catalysts were introduced to increase the octane rating of petroleum and to manufacture important primary feedstocks for the growing plastics industry. The glass, chemical and nitric acid industries all grew the demand for PGMs. This was followed in the 1960s by growing demand for platinum jewellery – given its purity, colour, prestige and value.

In the latter half of the 20th century, the platinum sector in South Africa was dominated by Gencor, JCI and Lonrho. Corporate actions eventually saw the mines in these groups housed under Impala Platinum, Anglo American Platinum and Lonmin respectively. These majors in the sector are responsible for producing up to 80% of the world's PGM supplies.

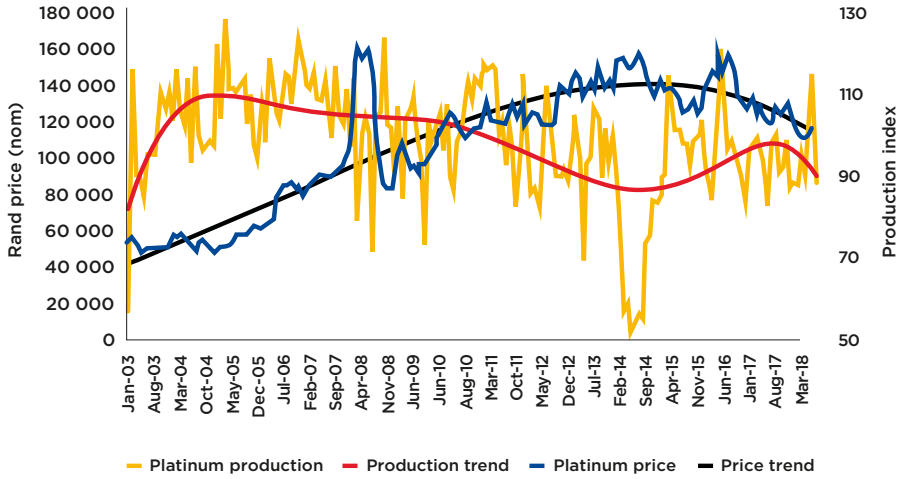
The advent of the use-it-or-lose-it approach to minerals rights (enshrined in the Mineral and Petroleum Resources Development Act) and the adoption of the mining


*Royal Bafokeng Platinum*

transformation charter in 2002 led to a shift in the sector and the rise of smaller platinum companies, including intense interest from foreign investors and operators alike. This legislation coincided with an upswing in PGM demand and prices from 2002 through to 2008, before a global economic depression and a number of structural changes to secondary supply (recycling) and falling demand from the jewellery and automotive sectors pushed platinum into oversupply, heralding the end of the glory days in the platinum sector and shutting many smaller operators down.

**"At** CURRENT **PRICES,** MORE **THAN 60%** Of the Platinum **MINING INDUSTRY IS** loss-MAKING or **MARGINAL."**

**South African platinum production vs platinum price**



# SCENARIO ANALYSIS OF STRATEGIC OPTIONS

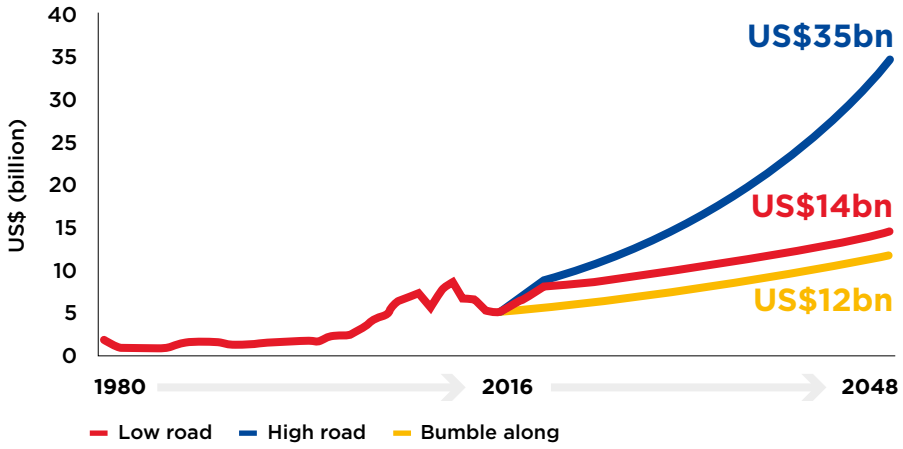
## Understanding the real economic and transformational potential of South Africa's platinum

In the past 35 years (1980 to 2015) South Africa has produced 221 million ounces (6,872 tons) of PGMs valued at R2.3 trillion at 2015 average PGM prices.

The PGM mining industry grew direct employment from 77,404 workers in 1980 to 188,078 employees by 2015. The equivalent of 4,423,724 direct job years was created by the platinum mining industry between 1980 and 2015. If indirect jobs are included (multiplier of 2.7 times), another 7,520,331 job years were created by the platinum sector in other areas of the economy (upstream suppliers industries, induced effects of wages paid, etc.). The total job years created by the PGM mining sector in the period was 11,944,055 a material contribution to the overall economy.

Given South Africa's significant PGM resource and reserve base, its well established mining industry and private sector expertise, it is useful to run three possible scenarios of the economic and transformational potential of the platinum sector for South Africa for the 35-year period 2016 to 2050. The following scenarios are envisaged;

**US$ value of South African platinum scenarios**




### The "Bumble Along" scenario:

Global PGM demand remains flat or even declines as a result of limited market development and loss of market share in key sectors with electric cars and gasoline cars dominating the automotive sector at the expense of diesel cars and platinum fuel cell electric vehicles (FCEV). Platinum continues to lose market share to palladium in gasoline cars. Jewellery demand and other industrial applications lose market share to other branded consumer products and other technologies. Rapidly escalating costs, falling productivity and limited cooperation between stakeholders results in South African mining production remaining flat, as primary supply fails to grow in line with flat demand. There is limited new technology used in mining and as South African production remains flat with declining investment in mining, lower grades and increased mining depth, given the strong correlation between people employed and tons milled, employment numbers remain flat or even decline.

### The "Low Road" scenario:

Short-term action is limited to South African Reserve Bank intervention only and the lack of alignment of stakeholders limits investment in market development. The price appreciates adding short-term value but mining supply and global demand remain flat. The South African mining industry continues to struggle with declining productivity and rising costs. Limited or uncoordinated cooperation between stakeholders including government, sees declining employment, lower capital expenditure and further strain on the economy.

### The "High Road" scenario:

In this scenario strong leadership, bold action and coordinated cooperation between all South African stakeholders results in a recovery in short-term viability and increased collaborative investment in market development. Increased investment achieves growth in all demand segments and the FCEV strategy can be supported as a long-term strategic aim. FCEVs gain significant market share, the jewellery sector grows as does investment demand. South African PGM mine production grows at a similar pace to match the growth in demand. Due to gradual modernisation of mining methods, employment growth is 2% per annum as rising productivity enables the 2.54% growth in South African mine production.

The US dollar value of South Africa's actual platinum production for the 35-year period from 1980 to 2015, combined with the three scenarios for the 35 years from 2016 to 2050 are illustrated above (this shows the value only of the platinum produced and excludes the other PGMs).

The following table highlights the outcomes of the various scenarios:

| | Actual outcome | Scenario 1: "Bumble Along" | Scenario 2: "The Low Road" | Scenario 3: "The High Road" |
|---|---|---|---|---|
| | 1980-2015 | 2016-2050 | 2016-2050 | 2016-2050 |
| Annual growth in RSA PGM supply | **4.1%** | 0% | 0% | 2.5% |
| Total platinum produced (ounces) | **128 million oz** | 160 million oz | 160 million oz | 260 million oz |
| Value of PGMs produced (in 2015 average price terms) | **US$135 billion** | US$168 billion | US$168 billion | US$273 billion |
| Value in 2050 of scenario | | $11 billion | $14 billion | $35 billion |
| Value difference Scenario 3 vs 1 | | | | $23 billion |
| Value difference Scenario 2 vs 1 | | | $3 billion | |
| Starting employment | **77,404** | 188,078 | 188,078 | 188,078 |
| Ending employment | **188,078** | 132,303 | 181,600 | 376,135 |
| Jobs created | **110,674** | -55,775 | -6,478 | 188,057 |
| Indirect jobs in 2050 | **188,146** | 224,915 | 308,730 | 639,430 |
| Direct job years created | **4,423,724** | 5,521,721 | 6,456,573 | 9,590,919 |
| **Total direct and indirect job years** | **11,944,055** | 14,908,648 | 17,457,046 | 25,895,480 |

The results of the scenarios are significant. Achieving a "high road" scenario would enable the South African PGM mining sector to mine 260 million ounces of platinum between 2016 and 2050. Even with a slower increase in employment numbers due to modernisation in mining, direct employment in the mining sector would rise to 376,135 employees by 2050, with another 639,430 indirect jobs created. This means that total employment created by PGM mining would be one million people by 2050.

The economic and social benefits for South Africa would be material and game changing:

- The country would be able to properly capitalise on its world class significant PGM mineral resource endowment, bringing a significant portion to account for the prosperity and benefit of South Africa.
- PGM production and GDP would more than double (up 141%) by 2050.
- Given the multiplier effects, direct and indirect GDP would at least double.
- Total direct and indirect employment would rise to one million people by 2050, and the quantum of salaries and wages paid to employees would increase dramatically.
- Supplier industries to PGMs would more than double their sales to the PGM mining sector.
- The growth would attract significant new investment into the platinum and associated industries, and attractive returns would be made by the sector.
- Economic transformation would receive a major boost from the growth in the sector, helping overcome legacies and driving positive societal change (through ownership, skills development, procurement, etc.).
- Export earnings from PGMs would also rise substantially, creating significant export earnings for the country.
- Significant taxation revenue would be paid to the government, which could in turn support the national budget priorities.

**1980-2015**

**77,404**
Starting employment

**188,078**
Ending employment

**110,674**
Jobs created

**188,146**
Indirect jobs in 2050

The environmental, industrial and energy benefits for the world would be significant:

- A doubling of PGM supply would play a significant role in enabling most countries to significantly reduce NOx, SOx and $CO_2$ emissions:
  - PGMs would enable the achievement of Euro stage VI emissions and higher over time via use in catalytic converter and particulate soot filter systems.
  - Realising the true benefits of migrating to the hydrogen economy with FCEVs and fuel cell bus fleets adopted at scale.
  - Stationary fuel cells would allow the generation of cost effective and clean baseload electricity on a decentralised basis (could be key for Africa's energy evolution).
  - PGMs used in ignition and spark plug systems support O2 sensors and more efficient engines.
- Increased use of PGMs in industrial processes increases the yields in chemical processes making them more efficient.
- PGMs would benefit technology
  - By improving the storage density of hard discs for laptops
  - In various other electronic and industrial applications.

The personal wellbeing of billions of people would be enhanced:

- Increased demand for PGMs in jewellery for adornment.
- PGMs used in medical applications would improve human health (such as in pace makers or in nanotechnology applications).
- PGMs used for investment purposes would reduce the beta (risk) in investment portfolios and provide a significant store of value for many millions of people. This could play a major role in encouraging financial stability in the world monetary and financial system. Given the rareness of PGMs, their store of value characteristics will come to the fore.


*Ivanplats*

**Perhaps a better way to state the issue is to measure the economic opportunity cost of the opportunity lost should the real potential of the South African PGM mining sector not be fully realised. Failure to achieve the high road will cost the country 188,057 additional direct mining jobs by 2050, US$23 billion in lost platinum production in 2050 alone, lost sales and exports, as well as other associated opportunities.**

**The potential is right there, with a competent mining sector and significant financial, technical, R&D leadership and other skills ready to seize this game changing opportunity for the country.**

**"SA PGM SUPPLY** could GROW **AT 2.5%** PER ANNUM."

# STRATEGY DEVELOPMENT CONSIDERATIONS

## A future market for PGM

The potential to unlock sales of US$35 billion per annum by 2050 means that the platinum mining sector could add as much to investment, exports, GDP as the gold mining sector did in the 20th century.

But for any of this real potential to be realised a future market for platinum must be developed. This can only be done if demand is created and to be successful South Africa has to create platinum demand at a global scale in the global market place.

To achieve this will require a far greater contribution to the impact of platinum promotion through support for existing programs driven by the Platinum Guild International (PGI) and the WPIC.

PGM demand can be created (as has been proved by PGI and WPIC). It requires deliberate strategies, funding and partnerships. Growing the support for existing platforms will drive significant positive demand growth.

It is about building the 'platinum mining' brand in South Africa- a shared vision that all South African's can subscribe to.

## Lead through joint stakeholder initiatives:

**Investment demand initiatives:**

- Expediting the South African platinum coin project, finalising distribution agreements, marketing and launching the product globally. This would include declaring the coin as legal tender (eliminating VAT) and might involve government underwriting some of the costs to support the business case for the South African Mint and Rand Refinery. The introduction of a platinum coin carries a potential incremental annual demand of 20,000 ounces plus.
- Treasury adopting platinum as a reserve asset and working with the industry to get clearance from the International Monetary Fund for platinum to play the same role as gold in the international monetary system. This carries a potential incremental once-off demand of 500,000 ounces.
- Additional funding for the WPIC would help fast-track investment promotion in platinum in China and elsewhere. Various projects exist which could drive additional annual demand of 100,000 ounces plus.

**Jewellery demand initiatives:**

- Invest in establishing brand presence for men's jewellery within India to build on successes achieved so far. This could add 100,000 ounces to demand annually.
- Target additional resources to supporting platinum in the bridal market in China's smaller (Tier 3 and 4 cities). This could result in longer-term additional annual demand of 200,000 ounces plus.
- Build new segment of Chinese jewellery demand in post-marriage gifting. Research suggests that a full-scale marketing launch could also stimulate additional demand of 200,000 ounces plus per annum.

**Industrial demand initiatives:**

- Investing in venture capital or early stage funding of companies, both inside and outside South Africa, which can deliver new applications for the PGMs. The potential incremental annual demand would be dependent on specific opportunities but should result in at least tens of thousands of ounces.
- Establishing the infrastructure for FCEVs (e.g. pilot project in Gauteng with the Gauteng government). While this would have limited potential direct demand, the longer-term potential is more substantial.
- Potential partnership with Sasol on gas/hydrogen (infrastructure in Gauteng). This has limited potential direct demand but substantial longer-term potential.
- Partnership with City of Johannesburg or Tswane and roll out a fleet of fuel cell driven buses (Rea Vaya). This would have limited potential direct demand but substantial longer-term potential.
- Treasury fiscal incentives for fabricating FCEV vehicles in South Africa and reduced import duties on imported vehicles. While this would have limited potential direct demand, the longer-term potential is more substantial.
- Raising domestic emissions standards to Euro stage 5 in the short term from the current Euro stage 2, and committing to further raising it to Euro stage 6. In this way, South Africa will demonstrate that its PGM sector is important and that it can show the way in Africa (and BRICS). This has a potential annual incremental demand of 10,000 ounces of PGMs plus.
- Modernisation of mining:
  - Through the hub and spoke model develop the technology and innovation capacity for more modernised mining in the sector.
  - The focus on improved safety outcomes, more skilled workers, lower extraction costs, better competitiveness and viability.

## Specific examples of South African stakeholder projects driving demand

### 1 Investment: A South African platinum coin

Physical precious metal products are attractive to many consumers as can be seen through the success of the South African Mint's gold Krugerrand. Although the platinum coin market is substantially smaller than the global gold coin market, demand is expected to average an annual 100,000 ounces per annum in 2016-2017.

The WPIC has successfully engaged with two mints outside South Africa, in the form of the Austrian Mint and the UK's Royal Mint, both of which have since launched platinum coins which have sold well. The US Mint also restarted production of its platinum eagle bullion coin in 2017, selling 20,000 ounces of coins to dealers within one week, suggesting that underlying demand for these coins is strong and that the marketplace does not have sufficient product availability to meet this demand.

The WPIC has previously commissioned independent research on the market potential for a South African-produced coin, potentially branded either with the Krugerrand name or the Mandela name. This concluded that at least 15,000 ounces of annual demand, but potentially over 100,000 ounces of annual demand, was realistic if a South African platinum bullion coin were minted and marketed.

The WPIC believes, based on its experience, that a run of only 15,000 to 20,000 ounces of platinum annually would be economically attractive.

Next steps in this process are for the strategy team to engage with the South African Mint and Rand Refinery to encourage further progress on this project, emphasising its wider value to South Africa. Government should investigate whether it is willing to underwrite the costs or potential losses of the Mint and Rand Refinery in undertaking such a project. Government should also look to grant a VAT exemption for any platinum bullion coin to match the treatment of the gold Krugerrand and make this more attractive to investors. WPIC would also engage with Rand Merchant Bank and others to examine the case for using a South African platinum bullion coin in custodial certificate products around the world, with the potential to drive additional coin demand and beneficiation within South Africa.

The benefit of this approach is that it would bring together a number of bodies already working in this space with considerable expertise in the coin sector and could therefore deliver additional demand within a short period of time at an attractive cost.

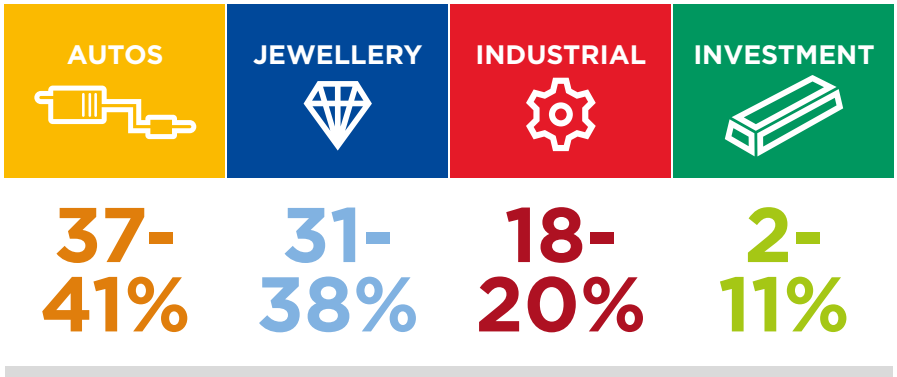
### 2 Jewellery: establishment of men's jewellery segment in India

The PGI has expended considerable effort to build a platinum jewellery market within India in recent years. From a very low base, annual demand has increased to in excess of 200,000 ounces of platinum per year. Additionally, the number of retail chains stocking platinum and the number of stores with platinum products for sale have grown at the same time. The PGI has built a successful Evara brand and a generic brand for platinum which is performing well in women's jewellery. With continuing market development spend and work, it seems reasonable that this market could double in size by the start of the next decade.

Research has shown that there is a further market segment that should be accessible to platinum in the form of men's jewellery where platinum can be used to symbolise status and success, particularly through larger and heavier pieces of jewellery. Platinum currently has a limited presence in this area and additional marketing spend would allow this to be addressed, potentially contributing 100,000 ounces of incremental annual platinum demand for an annual investment of US$4.6 million.

This spend would allow the PGI to work with its retail and manufacturing partners to develop this market, creating new designs, increasing product availability and marketing this both to the retail sector and through the retail sector to consumers themselves. This

### Global platinum demand 2017



approach could deliver incremental ounces rapidly through the PGI's current team and connections within the industry and is timely given the Indian retail jewellery sector's desire to rebuild revenues after demonetisation negatively affected gold jewellery purchasing in particular.

### 3 Reinforcing demand for platinum jewellery in China

The PGI has grown the Chinese platinum jewellery market to a peak of over two million ounces of annual demand through careful nurturing and market development over the last 20 years. However, the difficult economic environment that the platinum mining sector has faced in recent years has meant that spending within China has been cut back and this has had an associated negative impact on demand in this country.

Nonetheless, the PGI has a strong presence in and understanding of the Chinese jewellery sector and has identified two areas in particular where additional marketing spend could deliver attractive levels of incremental demand. These opportunities could be delivered through the existing organisation on the ground and could therefore be effected quite rapidly.

The PGI's current marketing focus is on larger Tier 1 and Tier 2 cities within China where economic growth has been fastest to date. However, the Chinese economy is now growing fastest in the 267 Tier 3 cities, with a total population equal to that of the Tier 2 and Tier 1 cities combined. By using existing marketing material for the bridal sector but targeting this at Tier 3 cities, this would access an additional four million brides and grooms per year and could create incremental annual demand of 350,000 ounces of platinum in the bridal segment. This programme is estimated to cost roughly $20 million annually but would deliver greater benefits to the South African economy.

There is a second opportunity which relies on reinforcing platinum's strong position as the metal symbolising love. The PGI believes that it can develop branded product ranges with partners to encourage consumers to give platinum as a post-marriage "love gift" on occasions such as wedding anniversaries, Valentine's Day etc. There are an estimated 21 million untapped consumers in the 30 to 45 year old age range who are married who could buy platinum. An annual spend of $15 million could generate additional annual platinum demand of 270,000 ounces.

### 4 Co-investing through venture capital in new industrial applications for the platinum group metals

Anglo American Platinum has invested in a number of early stage companies developing new industrial applications for platinum group metals. This approach seeks to find companies in any part of the world with technology which is already developed and with a realistic business case, and support them by providing capital to allow these companies to grow. In addition, Anglo American Platinum provides assistance in supporting these companies, and in many cases connecting them with other bodies to build new market opportunities. Four years ago, Anglo American Platinum established a corporate venture capital fund with the appropriate structure to identify possible companies in which to invest and then to invest and manage those investments for value over a period of time. This approach has the dual benefit of providing a commercial return on the money invested and the potential to grow new significant sources of demand for these metals more quickly than investing in early stage research and development would allow.

Anglo American Platinum's corporate venture capital fund has already invested in a number of companies. Examples include GreyRock, based in California, which is using a platinum group metal catalyst to produce clean fuel and hydrogen from flare gas. This company is now selling and deploying its first commercial scale units and if successful, could deliver additional metal demand, provide decentralised hydrogen to power fuel cell vehicles (triggering further platinum demand), provide clear environmental benefits by avoiding the flaring of gas and it should provide an economic return to its investors. Anglo American Platinum is working with Greyrock to evaluate further opportunities for business development and manufacturing localisation in Africa.

The fund continues to identify other investment opportunities and believes that it can deliver a similar range of benefits for investments from several to tens of millions of US Dollars.

### 5 Fuel cells: sponsoring a hydrogen town in China

The Minerals Council of South Africa believes that fuel cells and the hydrogen economy pose an attractive long-term opportunity for future platinum and PGM demand. There are clear benefits to South Africa of adopting this technology in terms of local jobs and skills development and also in terms of the creation of additional platinum demand. The Minerals Council would welcome government interest in demonstrating platinum-based fuel cell technology within South Africa.

However, the level of development of the hydrogen and fuel cell sector within South Africa is currently

not as advanced as that of some Asian countries and we feel that demonstrating the technology in the field overseas would be more likely to accelerate the adoption of fuel cells in South Africa as well as globally. This approach is more likely to lead to the generation of additional platinum demand in the nearer term.

For this reason, we believe it would be attractive to look at working with the Chinese government. China is currently providing very generous subsidies for fuel cell vehicle manufacturers and this has led to a surge of interest from companies operating in this space. China is also selecting a number of "hydrogen cities" where fuel cell vehicles will be deployed and where a hydrogen refuelling infrastructure will be installed at the same time.

The South African government could opt to sponsor, finance or shadow a small number of hydrogen cities as part of this wider adoption programme. This would widen the programme within China. Although this would add only a very limited quantity of demand in the short term, several hundred additional ounces, the longer term impact could be very significant. As importantly, it would provide a longer term boost for fuel cells – in public relations and in market development terms – giving them a greater chance of competing successfully with battery electric vehicles. Working through an existing Chinese programme would provide a chance to use the existing skills base, while China also has the scale for expansion to make a significant difference to platinum demand over the medium term. Furthermore, rapid progress in a Chinese context would provide a good learning opportunity for South Africa to follow in demonstrating fuel cells within South Africa, and might provide some export opportunities for South African companies such as Mpondo Fuel Cells.

# Implementation of the strategy

To achieve the vision and real potential of South Africa's PGM mining sector the following points will need to be considered:

- An industry champion to drive the strategy is required – and probably on a full-time basis.
- Small leadership teams can be coordinated by the this industry champion to drive specific advocacy and market development processes (and call in the CEOs when necessary).
- A comprehensive advocacy strategy should be developed.
- The idea of developing a brand strategy for the PGM mining sector should be considered.
- An annual review process would need to be established.


*Impala Platinum*

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