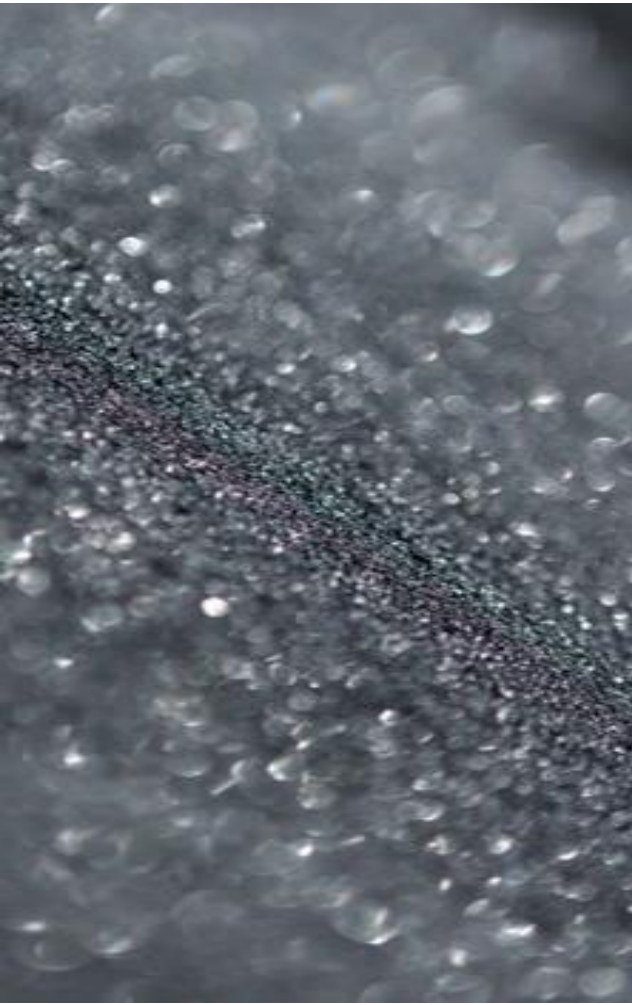


# tharisa

MEDIA VISIT

January 2018



# DISCLAIMER

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# WELCOME

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① Welcome

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② Introduction

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③ Mining

---

④ Processing

---

⑤ Markets

---

⑥ Outlook

---

⑦ Sustainability

---

# tharisa

INTRODUCTION



# THARISA'S JOURNEY

## DISCOVERING

2004

PROSPECTING  
RIGHTS  
APPLICATIONS

2006

PROSPECTING  
RIGHTS  
GRANTED

2008

MINING  
RIGHTS  
GRANTED

## DEVELOPING

2009

FIRST  
CHROME  
CONCENTRATE  
PRODUCTION  
FROM PILOT  
PLANT

2011

GENESIS  
PLANT  
COMMISSIONED

2012

VOYAGER  
PLANT  
COMMISSIONED

2013

CHALLENGER  
PLANT  
COMMISSIONED

## DELIVERING

2014

LISTED ON JSE

2016

LISTED ON LSE  
DIVIDEND PAYMENT

2017

RECORD  
FINANCIAL AND  
OPERATIONAL  
YEAR

INCREASED  
DIVIDEND

### THARISA STATISTICS\*:

- Reef tonnes mined = 24.4 Mt
- Waste moved = 63.3 m<sup>3</sup>
- PGM concentrate produced = 576.6 koz
- Chrome concentrates produced = 6.8 Mt

\*Oct 2010 to Dec 2017

### FY2018 Guidance:

- PGM concentrate of 150 kozpa
- Chrome concentrates of 1.4 Mtpa  
(350 ktpa of which will be specialty grade)

# THE GROUP AT A GLANCE

## THARISA MINERALS

### RESOURCE

867.5 Mt resource  
97.0 Mt reserve of which 78.3 Mt open pit

### MINING

17 year open pit LOM  
40 year underground extension

### PROCESSING

400 ktpm nameplate capacity  
Genesis Plant (100 ktpm)  
Voyager Plant (300 ktpm)

### LARGE SCALE

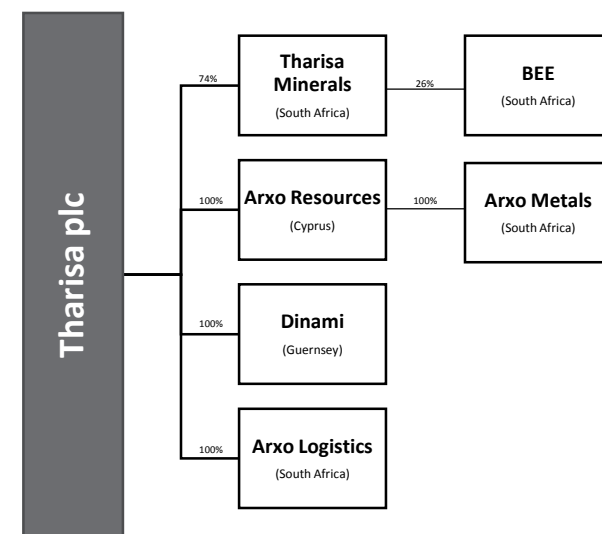
One of the world's largest single chrome resources

### MECHANISED

Mechanised open pit mining with a skilled and focused labour force  
Owner mining model

### DERISKED

In production, major capex complete  
FY2018 production of 150.0 koz PGMs and 1.4 Mt of chrome concentrates



## ARXO METALS

### BENEFICIATION

Production of specialty grade chrome concentrates

### THIRD PARTY

Plant operation

### R&D

New technology assessment  
1 MW PGM smelter

## ARXO RESOURCES/DINAMI

### MARKETING AND SALES

Significant trader of chrome concentrates  
Third party trading  
Global reach for specialty chrome concentrates

## ARXO LOGISTICS

### LOGISTICS

Road/rail transport, warehouse and port facilities for bulk chrome concentrates  
Road transport of PGMs

## CUSTOMERS

### AGREEMENTS

PGM offtake– Impala Platinum  
Sale and joint R&D - Lonmin  
Specialty offtake/agency – Rand York  
Metallurgical agency – Noble Group  
Strategic agreement – Tisco JV

## REEF MINED

↑3.9%

**5.0 Mt**

(2016: 4.8 Mt)

## PGM PRODUCTION

↑8.3%

**143.6 koz**

(2016: 132.6 koz)

## CHROME CONCENTRATE PRODUCTION

↑7.0%

**1.3 Mt**

(2016: 1.2 Mt)

## SPECIALTY GRADE CHROME PRODUCTION

↑19.9%

**323.1 kt**

(2016: 269.4 kt)

## REVENUE

↑59.1%

**US\$349.4m**

(2016: US\$219.6m)

## EBITDA

↑168.7%

**US\$115.6m**

(2016: US\$43.0m)

## HEPS

↑266.7%

**US\$ 22 cents**

(2016: US\$ 6 cent)

## DIVIDEND

↑400.0%

**US\$ 5 cents**

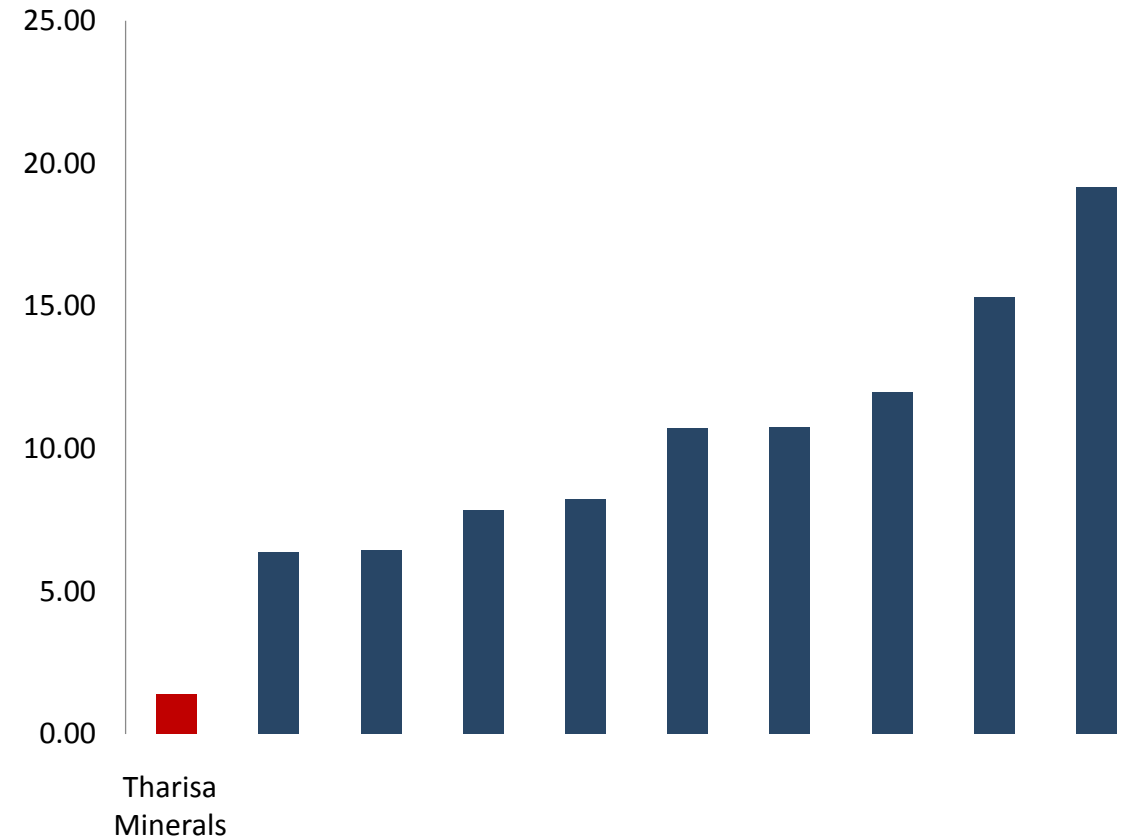
(2016: US\$ 1 cent)

# SAFETY

## SAFETY AND HEALTH A PRIORITY

- Safety remains a priority of management and all employees – we strive for zero harm
- As at 31 December, Tharisa Minerals achieved 15 156 588 fatality free hours and 1 714 765 fatality free shifts
- During 2017 Tharisa Minerals was awarded the following awards:
  - MHSC Award for 2 000 Fatality Free Production Shifts
  - Mine Safe Award for Best Safety Performance in Class
  - Mine Safe Award for Best Improved Performance

## COMPARATIVE LTIFR RATE





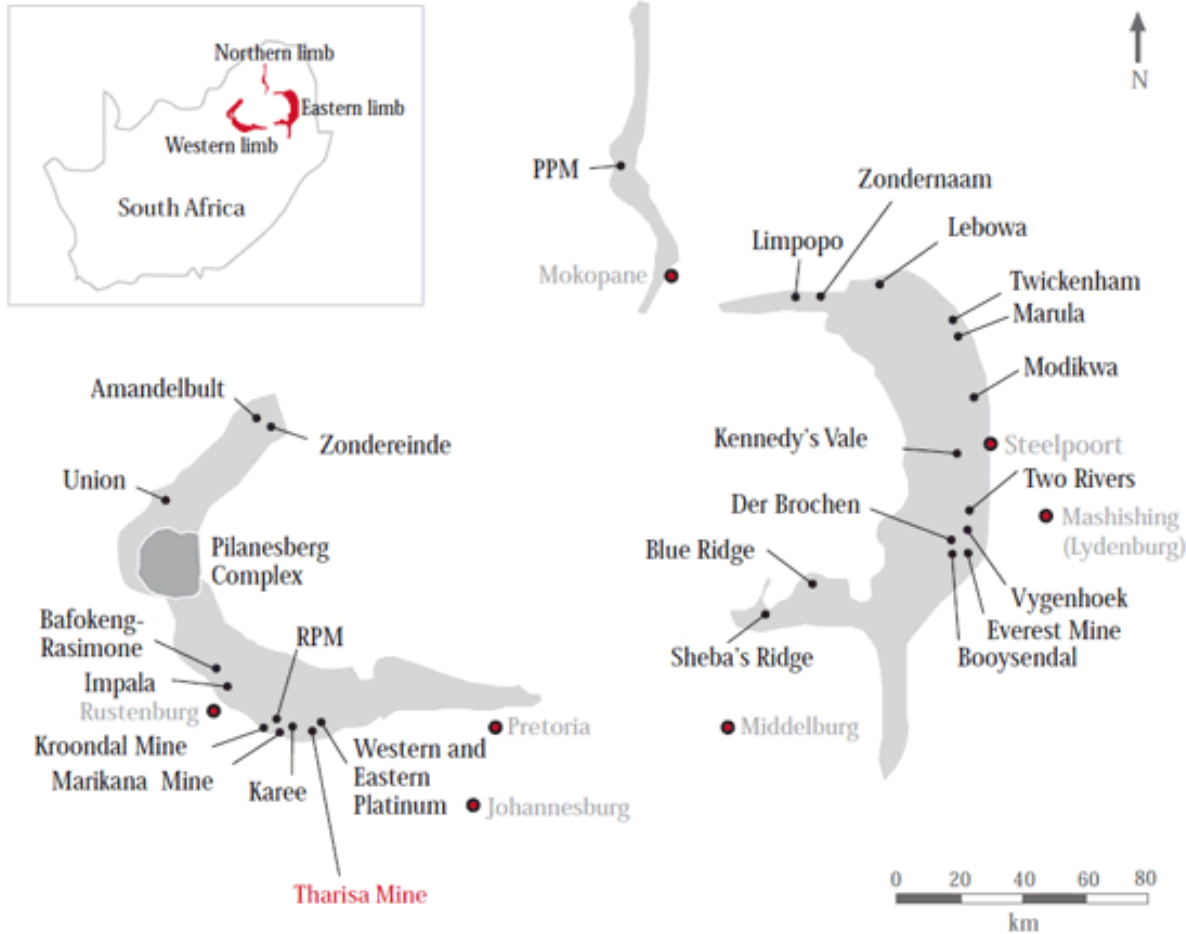
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MINING

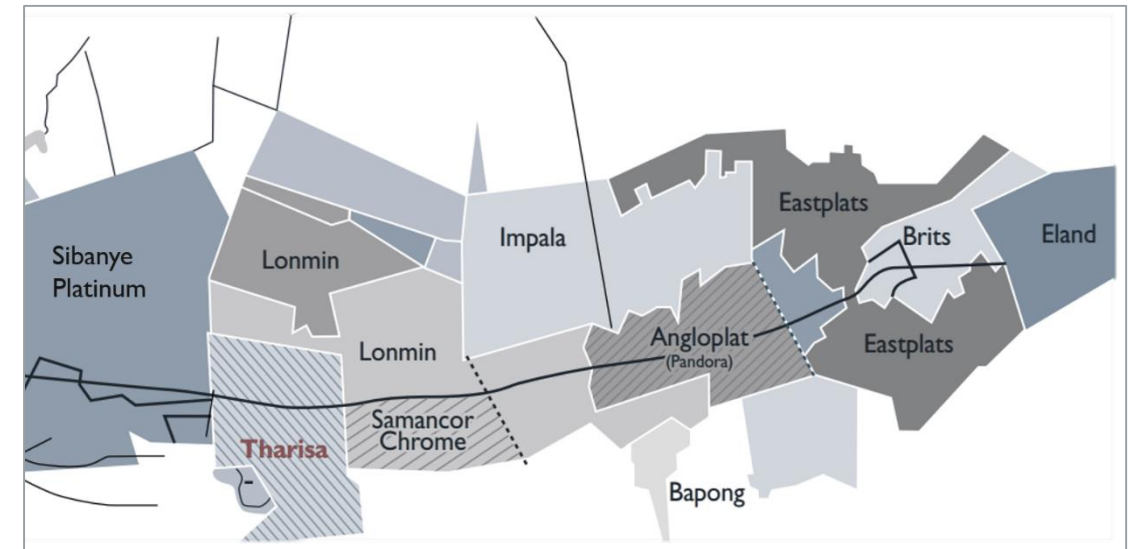


# MINING

## LOCATED IN THE MAIN PGM AND CHROME PRODUCING AREA IN SOUTH AFRICA



- Mining rights over 5 475 ha
- Adjacent to Sibanye Platinum, Lonmin, Impala Platinum, Samancor Chrome
- Well serviced by road, rail, power and other services
- Neighbouring towns are Brits (45 km) and Rustenburg (35 km)



# MINING

## RESOURCES AND RESERVES

Mining rate of 5.0 Mtpa with an average stripping ratio of 9.6 (m<sup>3</sup>:m<sup>3</sup> basis)

### MINERAL RESOURCE

- 867.5 Mt
- 1.59 g/t 6PGE+Au
- 20.7% Cr<sub>2</sub>O<sub>3</sub>

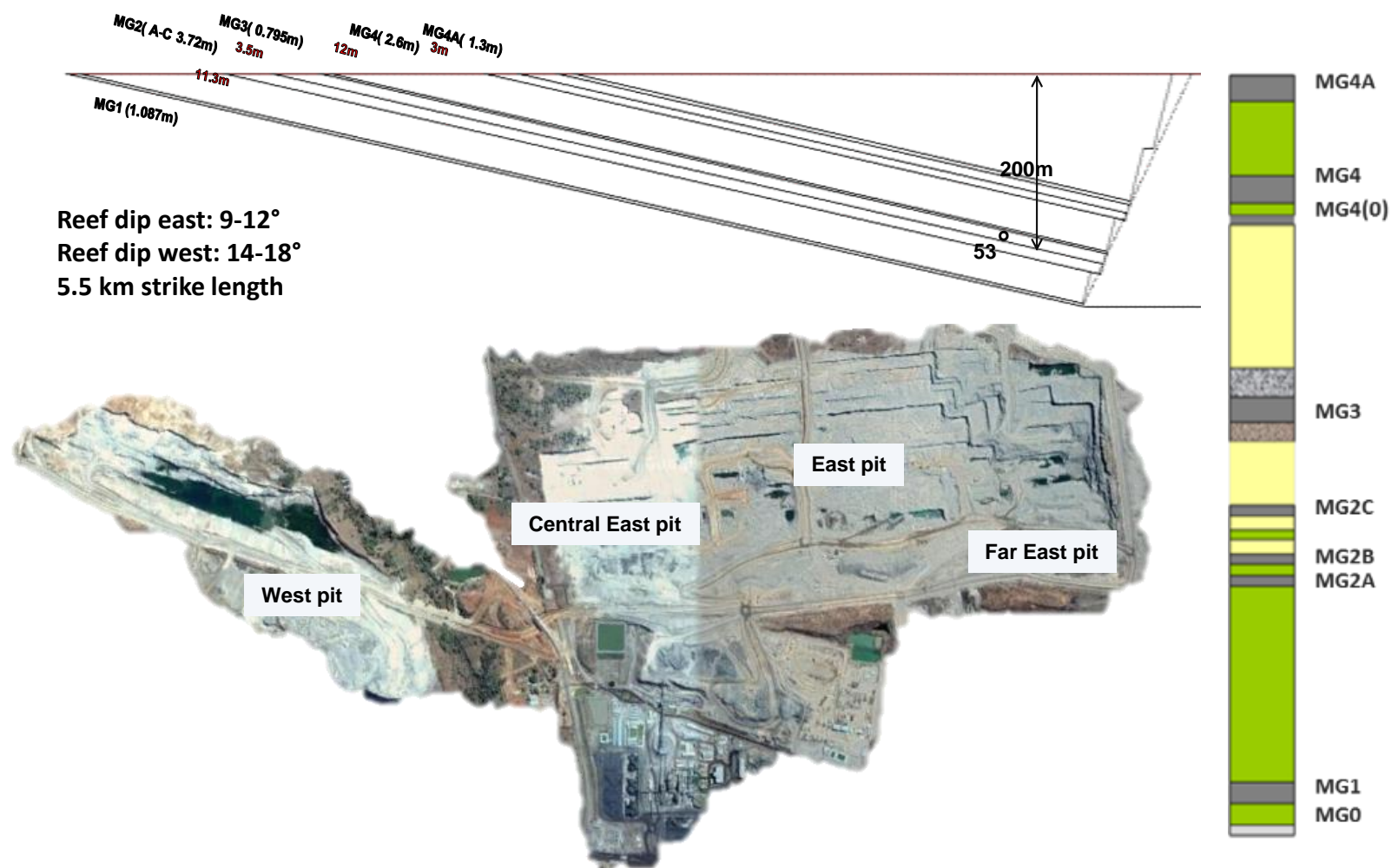
### MINERAL RESERVE

- 97.0 Mt
- 1.39 g/t 5PGE+Au
- 18.9% Cr<sub>2</sub>O<sub>3</sub>

### OPEN PIT MINERAL RESERVE

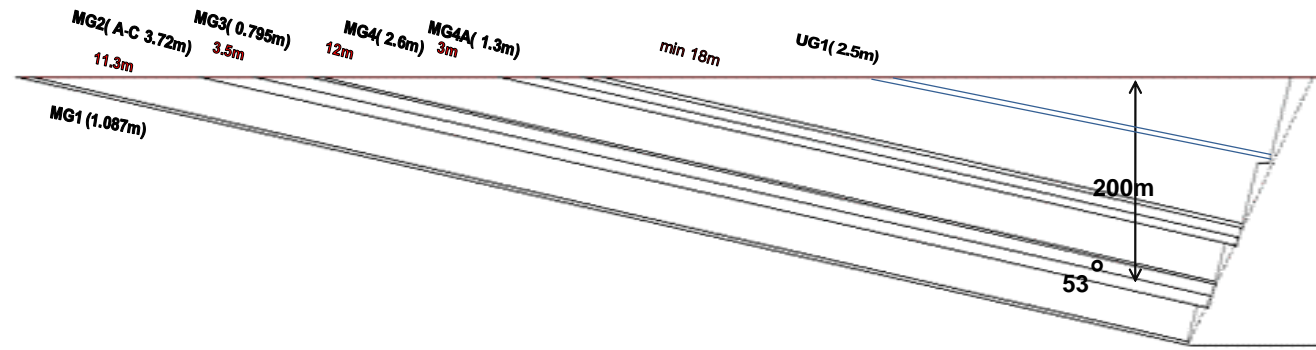
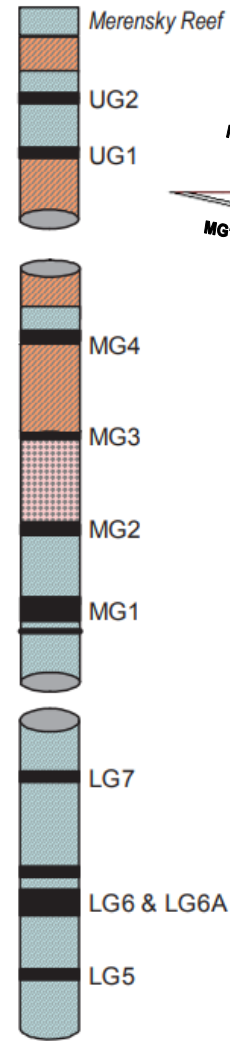
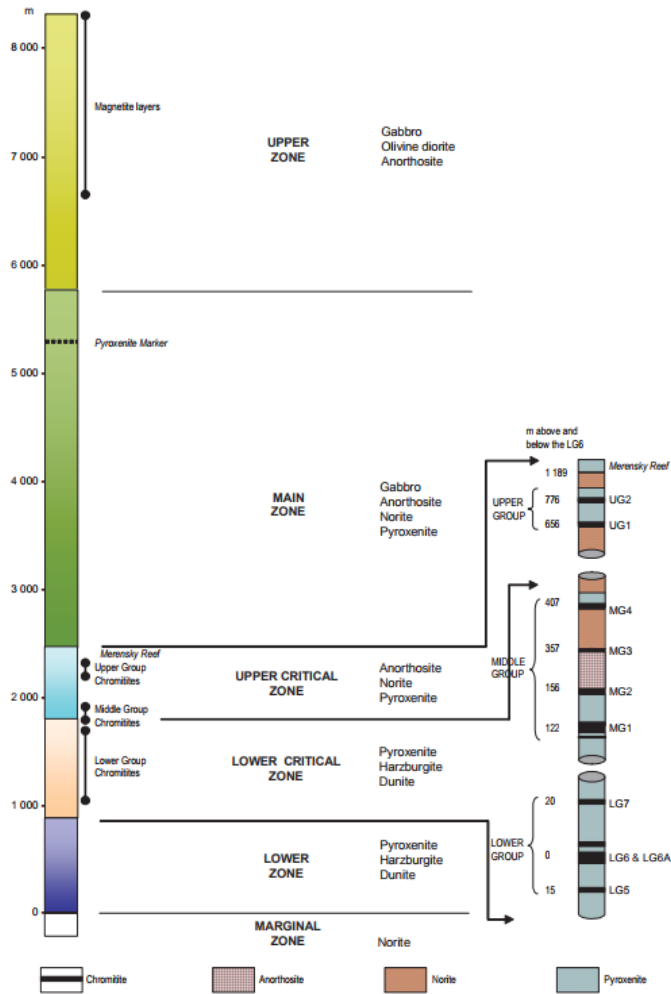
- 78.3 Mt
- 1.39 g/t 5PGE+Au
- 18.9% Cr<sub>2</sub>O<sub>3</sub>

## GENERALISED CROSS SECTION SHOWING THE MG CHROMITITE LAYERS AT PLANNED DEPTH



# STRATIGRAPHY OF BUSHVELD COMPLEX

Generalised Stratigraphic Column of Rustenburg Layered Suite, Bushveld Complex  
(after Viljoen and Schürmann, 1998)



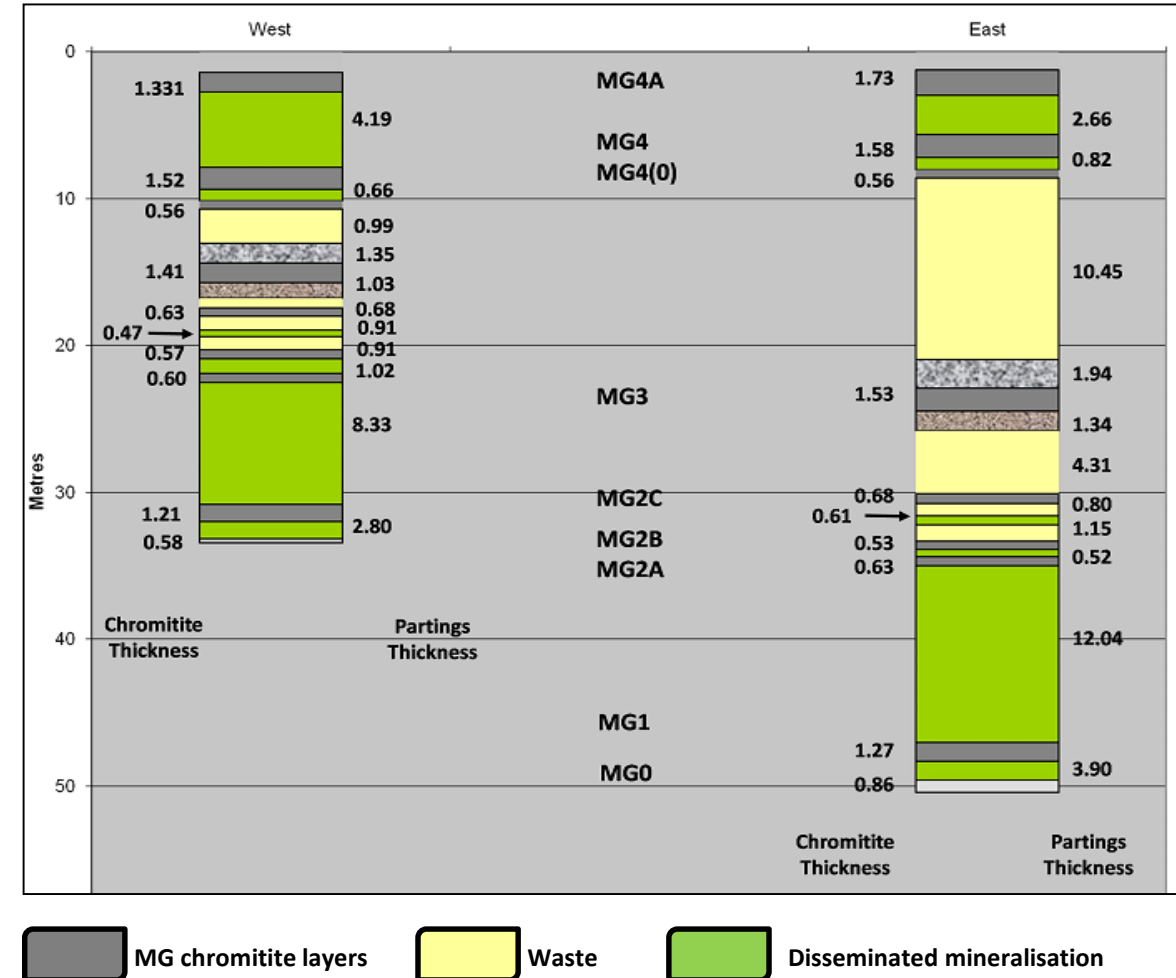
## GEOLOGY

- The MG reef package is classified into six chromitite layers
  - MG0, MG1, MG2, MG3, MG4, MG4A
- Partings are generally anorthosite, pyroxenite or norite
- Reef package varies from 50 m in the west to 74 m in the east (incl. partings)
- PGMs are concentrated in the MG2, MG3 and MG4 reefs

### MINING SEQUENCE AND PROCESS ROUTE

UNIT	PROCESS
MG4A chromitite layer	Sent to Genesis Plant
Parting	Discarded
MG4 package	Sent to Voyager Plant
Anorthosite or norite	Selectively mined and discarded
MG3 package	Sent to Voyager Plant
Anorthosite or norite	Selectively mined and discarded
MG2 package	Sent to Voyager Plant
Pyroxenite with disseminated mineralisation	Selectively mined and discarded
MG1 package	Sent to Genesis Plant

## MG REEF STRATIGRAPHY



# OWNER MINING TRANSITION

## INHOUSE

### Mining Expertise

Mine management

Geologists

In-pit supervisors

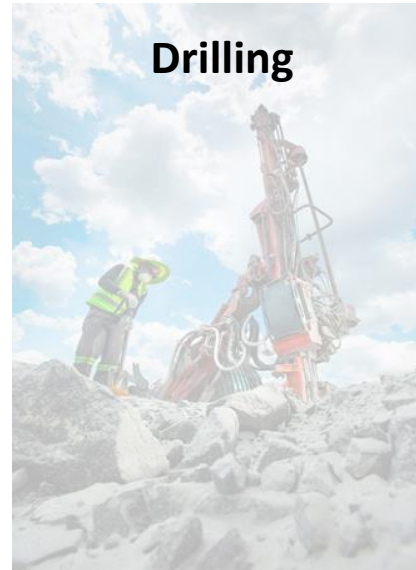
Surveyors

Engineers

Maintenance

## INSOURCING

effective 1 October 2017



### Drilling



### Plant and equipment

Purchased yellow fleet, infrastructure and components

Estimated fleet replacement value ~US\$145.0 m



### Skills

Transferred ~900 mining employees

### Optimised primary mining fleet

- 19 drill rigs
- 11 excavators
- 46 trucks
- Capable of moving 17 Mm<sup>3</sup> per annum
- ~85 support vehicles

*Blasting is outsourced*

### Benefits

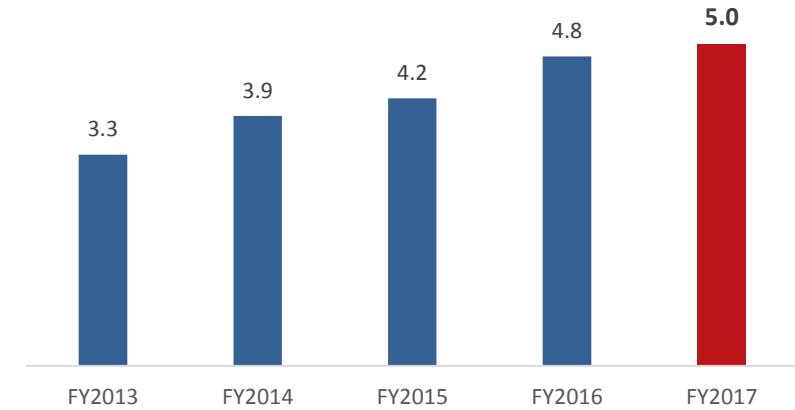
- Safety culture alignment
- Greater control over stripping rates
- Quality and grade control
- Unit cost reduction through efficiency
- Proactive preventative maintenance

## KEY OPERATIONAL METRICS

		Q1 FY2018	FY2017	FY2016
Reef mined	kt	1 245.3	5 025.1	4 837.2
Stripping ratio	m <sup>3</sup> :m <sup>3</sup>	7.8	7.5	7.3
PGM rougher feed grade	g/t	1.49	1.56	1.65
Chrome grade	%	18.1	17.8	18.0

## REEF MINED

Mtpa



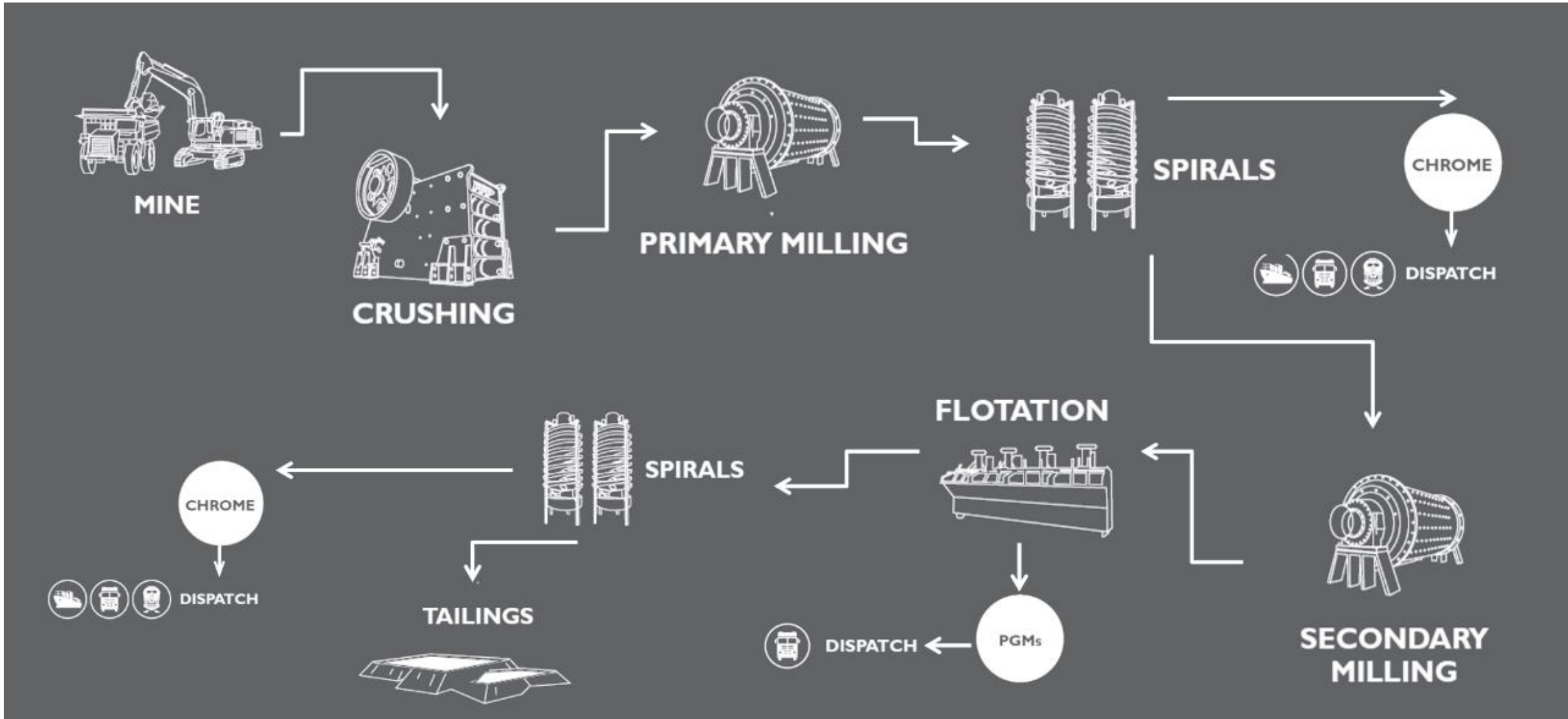
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PROCESSING





# INNOVATIVE APPROACH



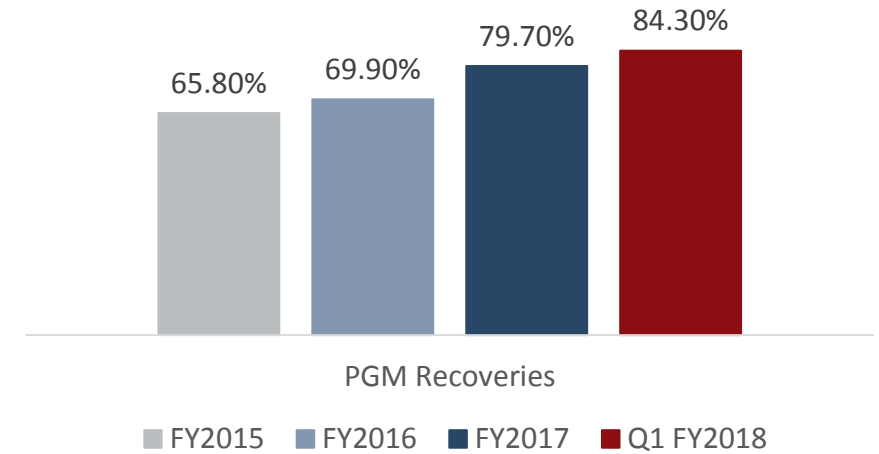
# PROCESSING PLANTS

## GENESIS PLANT

- Capacity: 100 ktpm ROM
- Processes reef layers with lower PGM and higher chromite grades
- Challenger Plant recovers high value foundry grade and chemical grade chrome concentrates

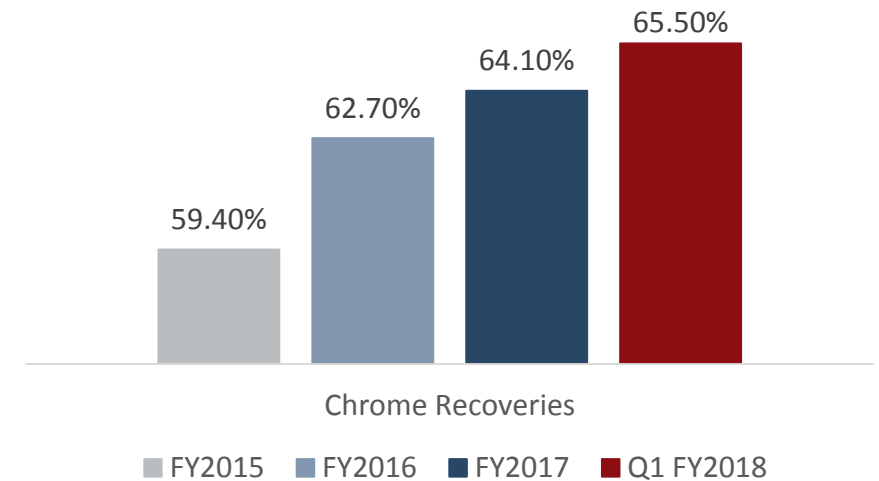


## EXTRACTING MORE OUT OF EACH TONNE



## VOYAGER PLANT

- Capacity: 300 ktpm ROM
- Processes reefs with higher PGM and lower chromite grades
- Produces both metallurgical and chemical grade products

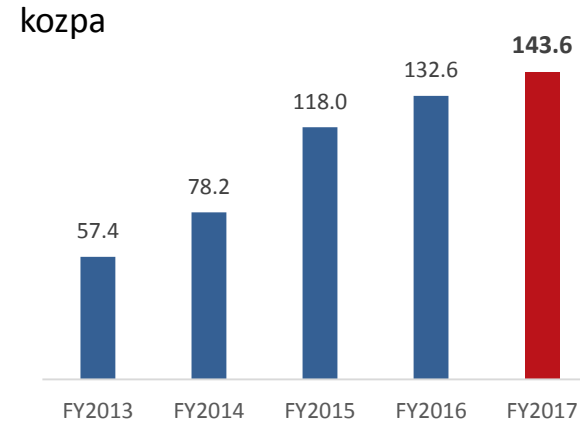


# PROCESSING HIGHLIGHTS

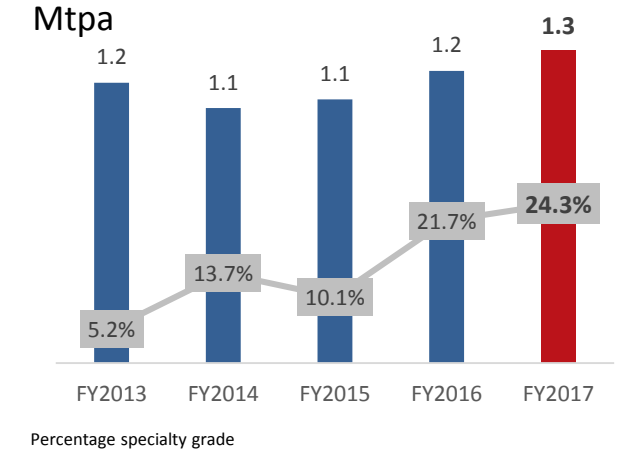
## KEY OPERATIONAL METRICS

		Q1 FY2018	FY2017	FY2016
ROM processed	kt	1 310.2	4 916.2	4 656.3
PGM recovery	%	84.3	79.7	69.9
PGM in concentrate produced	koz	38.8	143.6	132.6
Chrome recovery	%	65.5	64.1	62.7
Chrome concentrate produced	kt	365.8	1 331.2	1 243.7

## PGM PRODUCTION



## CHROME PRODUCTION



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MARKETS

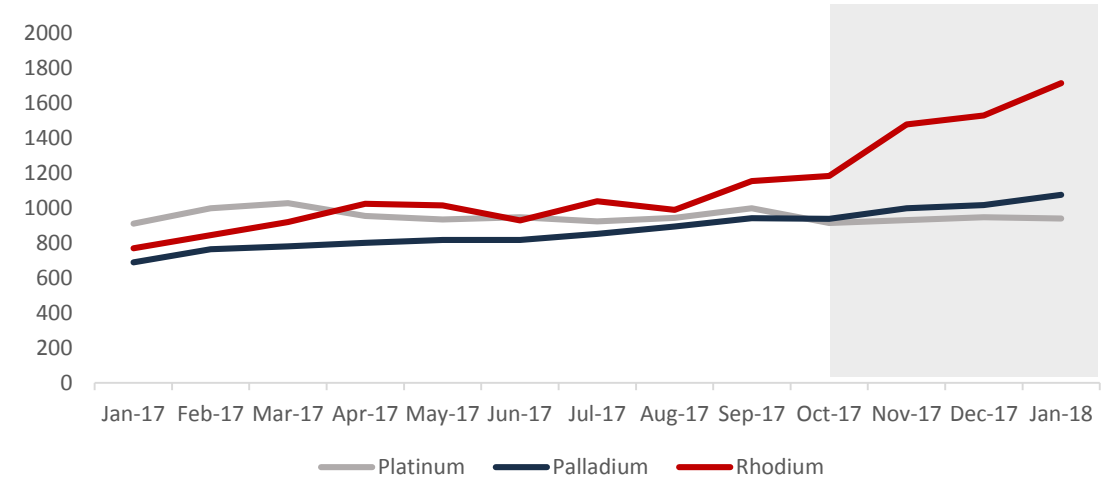


# PGM MARKET

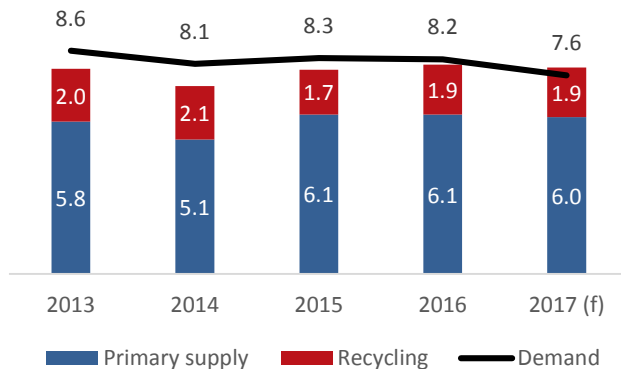
## PLATINUM DEMAND AND SUPPLY

- Demand driven by the auto catalyst, jewellery, industrial and investment sectors
- Both primary and secondary sources of supply seen decreasing
- Primary supply weaker in 2017 due to suppressed average prices, with lower capital investment and cost increases
- In 2017 platinum market expected to be close to balance
- WPIC forecast deficit in 2018 of 250 koz

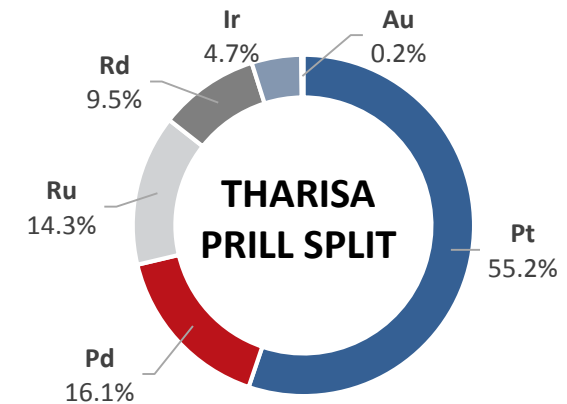
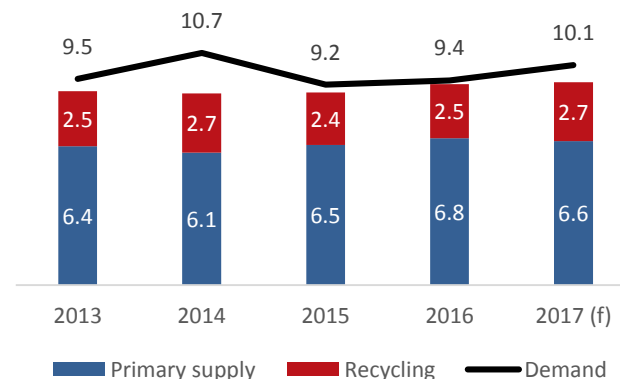
## PLATINUM, PALLADIUM AND RHODIUM MARKET PRICES [US\$/oz]



## PLATINUM DEMAND AND SUPPLY [Moz]



## PALLADIUM DEMAND AND SUPPLY [Moz]



## DEMAND AND SUPPLY

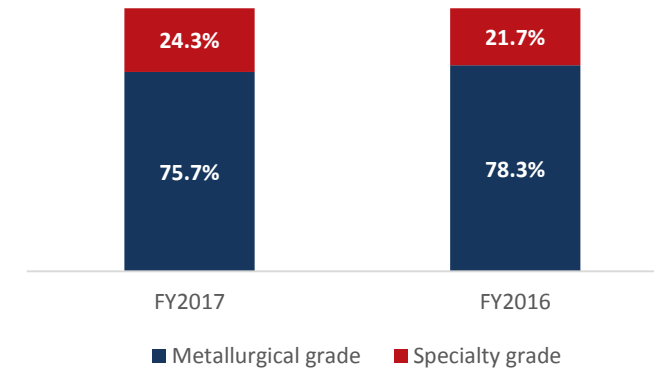
- Demand for metallurgical grade chrome concentrate is driven by its use in the manufacture of stainless steel, the production of which is estimated to grow at between 3% to 5% in 2018
- China is wholly dependent on imports of chrome ore
- Chrome prices were volatile during 2017, peaking at US\$390 and dipping to US\$130
- Metallurgical chrome currently trading above a spot price of US\$215/t
- Chrome stocks at Chinese ports are at 2.14 Mt – just over two month’s supply to the ferrochrome and stainless steel industry

CHEMICAL GRADE	FOUNDRY GRADE
Cr <sub>2</sub> O <sub>3</sub> - 45% to 47% SiO <sub>2</sub> - <1.2%	Cr <sub>2</sub> O <sub>3</sub> - >46% SiO <sub>2</sub> - <1.0%
Used to produce sodium dichromate used in leather tanning, pigments, plating	Used in moulds for metal castings and nozzle sands

## METALLURGICAL GRADE CHROME PRICE / PORT STOCK

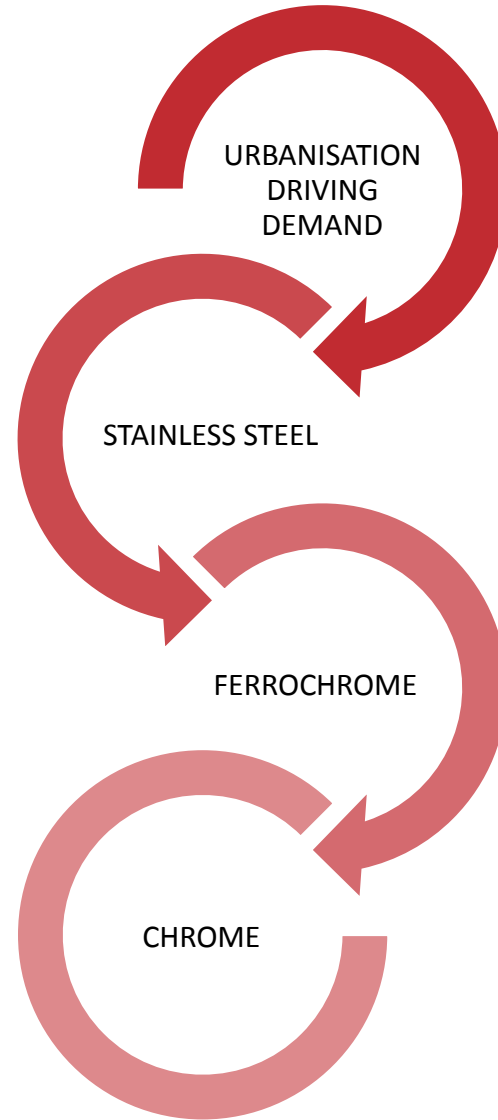
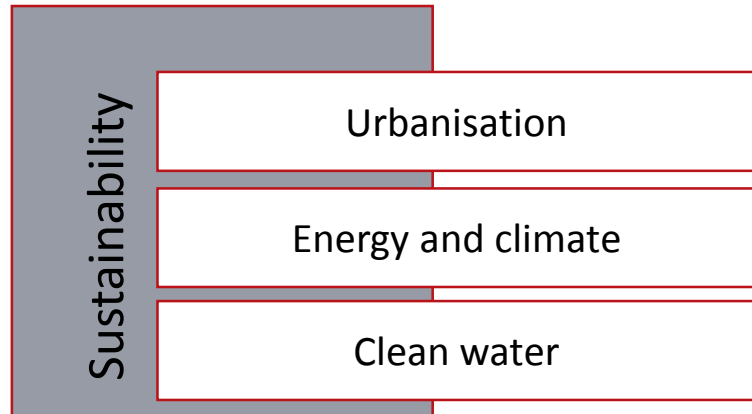


## THARISA PRODUCT MIX



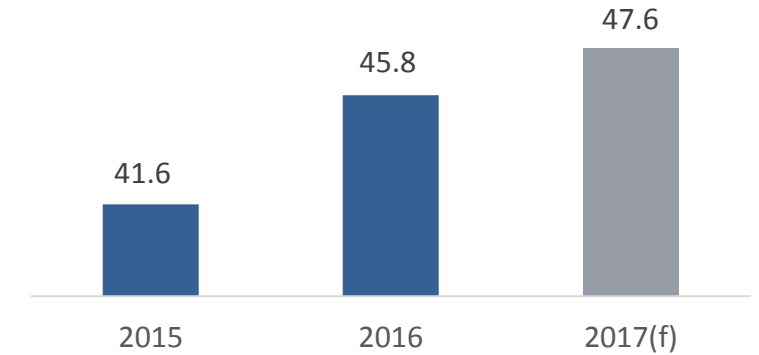
# CHROME MARKET FUNDAMENTALS

## TRENDS DRIVING STAINLESS STEEL DEMAND



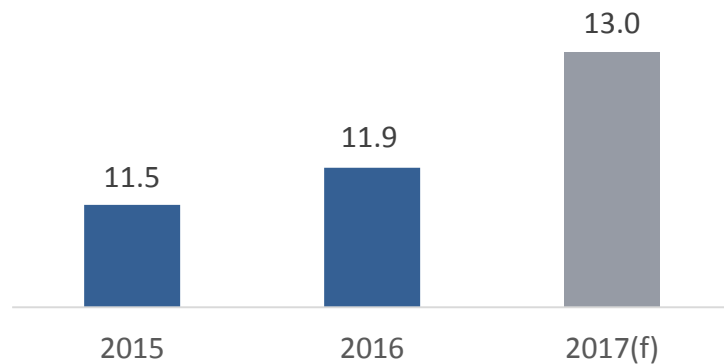
## GLOBAL CRUDE STAINLESS STEEL PRODUCTION

[Mt]



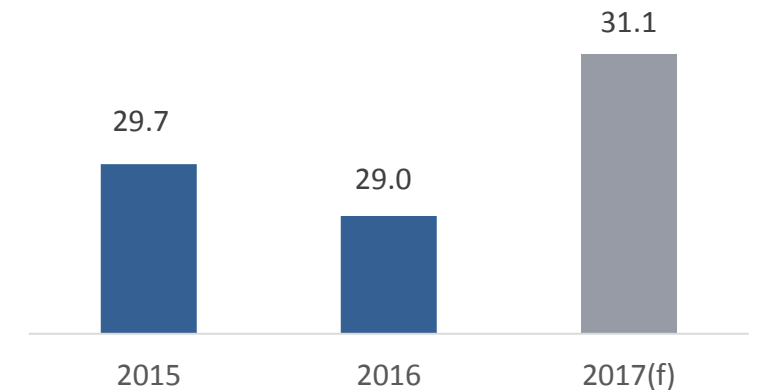
## GLOBAL FERROCHROME PRODUCTION

[Mt]



## GLOBAL CHROME PRODUCTION

[Mt]



# STAINLESS STEEL

## TO PRODUCE ONE TONNE OF FERROCHROME

CHROME ORE  
2.5 tonnes



FERROCHROME  
1 tonne



STAINLESS STEEL  
4 tonnes

## TO PRODUCE ONE TONNE OF STAINLESS STEEL

CHROME ORE  
0.6 tonnes

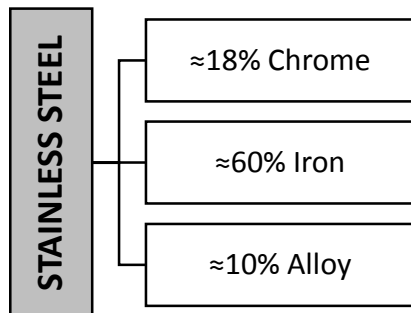


FERROCHROME  
0.25 tonne

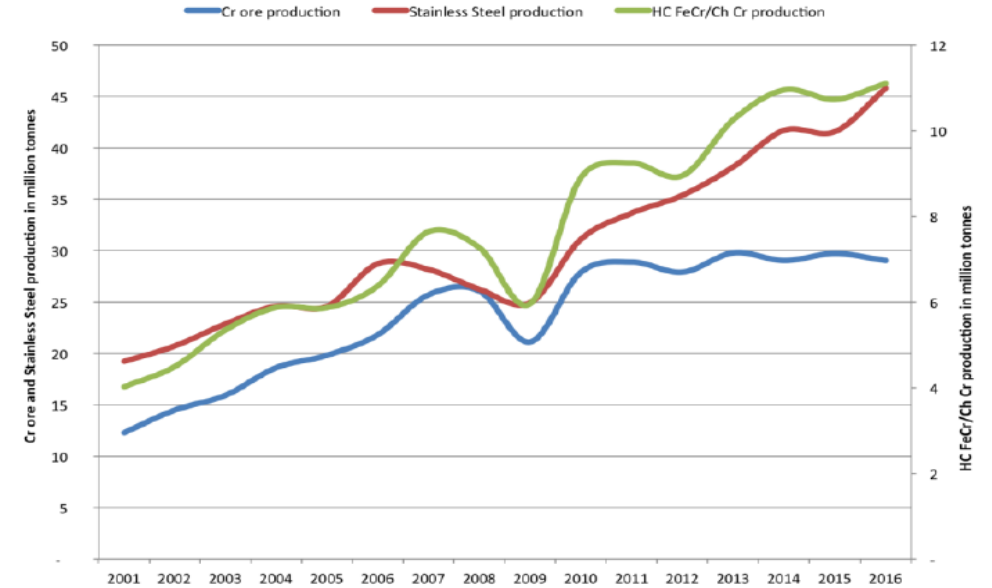


STAINLESS  
STEEL  
1 tonne

## TYPICAL STAINLESS STEEL COMPOSITION



## DEMAND CORRELATION



## USES OF STAINLESS STEEL

- 29% - consumer goods and medical
- 18% - food and catering
- 16% - chemical, petrochem and energy
- 15% - ABC and infrastructure
- 8% - Industrial
- 7% - Light automotive
- 4% - Other



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OUTLOOK



# VALUE ADD INITIATIVES FY2017

## SUPPLYING TISCO JV

- One of the largest stainless steel producers
- Five year strategic cooperation agreement
- Minimum of 240 ktpa chrome concentrate at market prices
- Represents ~25% of Tharisa's metallurgical grade chrome concentrate
- Effective September 2017



## THIRD PARTY CHROME

- Arxo Metals entered into an agreement with Western Platinum
- Operates the K3 UG2 plant and markets and sells UG2 chrome produced
- Approximately 200 ktpa of chrome concentrates



## PGM RICH ALLOY

- Commissioned 1 MW DC furnace to produce PGM rich alloy on a pilot scale
- Further beneficiation capability
- On sale and further beneficiation of PGM rich alloy with Lonmin under PGM research and development co-operation agreement



# OUR STRATEGIC PLAN

Short  
term



Improved quality mining  
volumes and grades

Maintaining and increasing  
PGM and chrome recoveries

Automation of control  
systems

Medium  
term



Grow production profile

Vision 2020 =  
200 kozpa of PGMs +  
2 Mtpa of chrome  
concentrates

Longer  
term



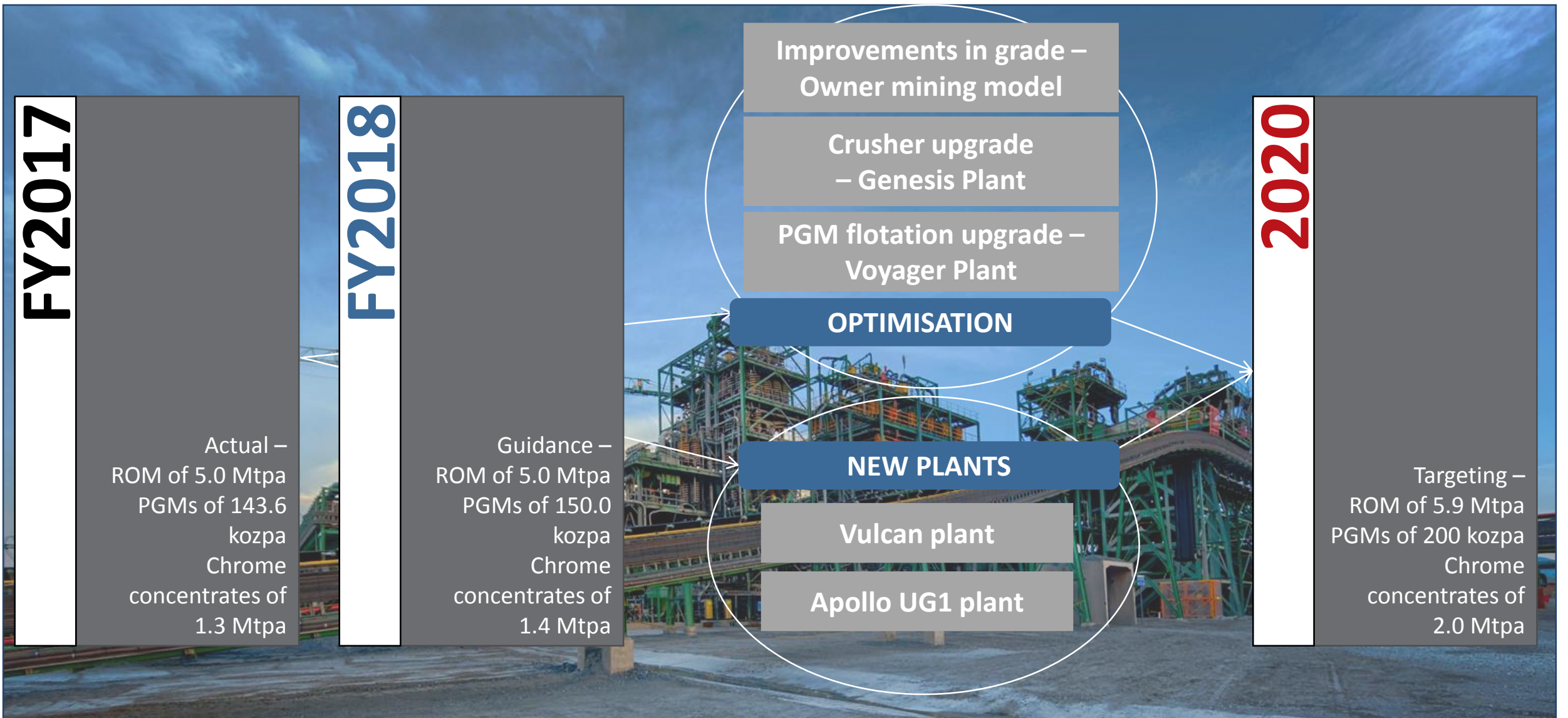
Greenfields opportunities

Value-accretive  
acquisitions

Seek value across  
commodities and  
geographies

A globally significant low cost producer of strategic commodities

# VISION 2020



## CRUSHER UPGRADE – GENESIS

- Upgrade of crushing stage at Genesis Plant
- Increase Genesis Plant throughput by 15%, ~180 ktpa
- Potential to increase chemical grade chrome production by ~ 24 ktpa and ~ 18 ktpa foundry grade chrome production
- Planned commissioning in July 2018
- Capex of ~ ZAR90M
- Opex = R10/t
- Payback of less than 12 months

## PGM OPTIMISATION - VOYAGER

- Additional flash flotation and scavenger with high energy mechanisms to improve recovery at the Voyager Plant
- Increase PGM production at the plant by 14 kozpa
- Planned commissioning October 2018
- Capex of ~ ZAR70M
- Opex = negligible
- Payback of less than 12 months

## VULCAN FINE CHROME RECOVERY PLANT

- Additional recovery of fine chrome from tailings streams
- Proprietary process developed by Tharisa
- Demonstration scale plant to be constructed in FY2018
- Feasibility study and process design will be undertaken in conjunction with the operation of the demonstration plant
- Estimated production of 380 ktpa of chrome concentrates
- Planned commissioning October 2019
- Capex of ~ ZAR300M
- Opex = R50/t

## APOLLO CHROME AND PGM PLANT

- Design and build an independent chrome plant with PGM flotation plant aimed at production of chrome concentrate from UG1 ore and additional MG reef horizons
- Designed in two phases, the first phase treating 50 ktpm and the second phase to double capacity
- UG1 reef in west pit is easily accessible
- Feasibility study being conducted, test work and resource estimation in progress
- Plant construction to take approximately 12 months
- Estimated production of 6 kozpa PGMs and 180 ktpa chrome concentrates
- Planned commissioning March 2020
- Capex of ~ ZAR300M
- Opex (including mining) = R225/t

# VISION 2020

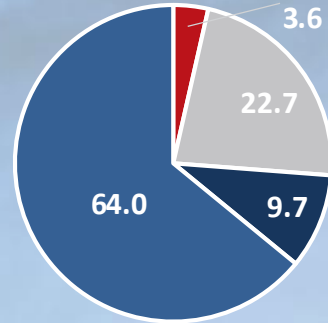
**FY2017**

Actual –  
ROM of  
5.0 Mtpa  
PGMs of  
143.6 kozpa  
Chrome  
concentrates  
of 1.3 Mtpa

**FY2018**

Guidance -  
ROM of  
5.0 Mtpa  
PGMs of  
150.0 kozpa  
Chrome  
concentrates  
of 1.4 Mtpa

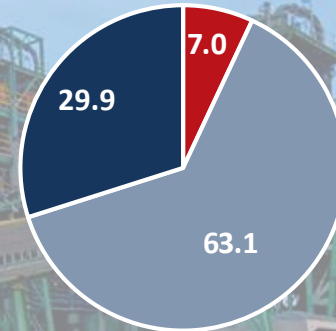
PGM % contribution



Adding  
61.8 kozpa

- Crusher Upgrade
- PGM Optimization
- Apollo Plant
- Improved Mining Grades

Chrome % contribution



Adding  
602.0 ktpa

- Crusher Upgrade
- Vulcan Fine Chrome Plant
- Apollo Plant

**2020**

Targeting -  
ROM of  
5.9 Mtpa  
PGMs of 200  
kozpa  
Chrome  
concentrates  
of 2.0 Mtpa

# DELIVERING ON OUR STRATEGY

## LEADING NATURAL RESOURCES GROUP

Globally significant diversified low cost operations

## INNOVATION

Growth through innovative research and development

## OPTIMISATION INITIATIVES

Maximise value extraction  
2 new projects  
2 new plant

## LEVERAGING MARKETING AND LOGISTICS PLATFORM

Marketing, sales and logistics platform  
Expansion into multi-commodities  
Geographic diversity

## CAPITAL DISCIPLINE

Dividend policy of 15% NPAT minimum  
Capital allocation to low risk projects

**Record financial and operational year in FY2017**

**Organic growth and R&D  
Vision 2020**

**Improved recoveries**

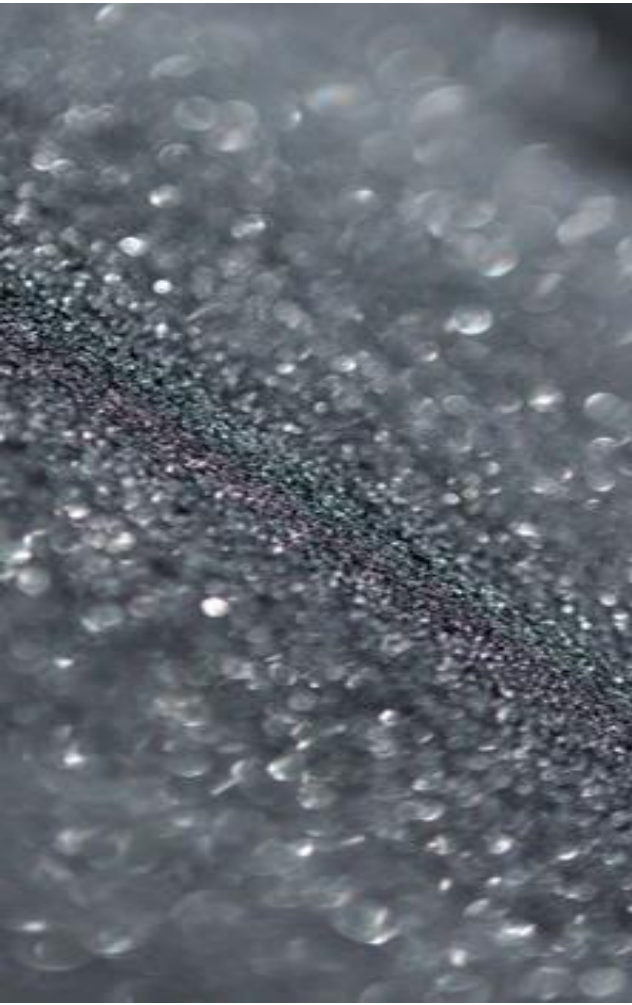
**Initiated third party agency and logistics**

**Dividend of US\$ 5 cents per share  
Introducing interim dividend from 2018**



# tharisa

SUSTAINABILITY



# SUSTAINABILITY

## THUSANANG WELLNESS PROGRAMME

- TB programme
- HIV/AIDS programme
- Cancer awareness programme
- Wellness days
- Peer educator programme



## COMMUNITY PROJECTS

- Support of community SMME – Rocasize
  - Garden services
  - Brick making
  - Clothing and personal protective equipment
- Retief Primary school food forest



# SUSTAINABILITY

## ENVIRONMENT

- Subscribe to the Equator Principles
- Environmental monitoring plan
- Environmental rehabilitation provision of US\$13.7M

## LABOUR RELATIONS

- No labour disruptions during the year
- Transferred ~900 employees from previous mining contractor post the financial year end
- Tharisa Minerals total staff compliment ~1 700

## TRAINING AND DEVELOPMENT

- On mine training centre
- Learnerships, adult education and training
- Compliance to competency



# HIV/AIDS IN SOUTH AFRICA

- South Africa has the highest HIV epidemic profile in the world, with an estimated 7.1 million people living with HIV in 2016. One third of all new infections in 2016 were in one country: South Africa.
- In the same year, there were 270 000 new infections while 110 000 South Africans died from AIDS-related illnesses.
- South Africa has the largest antiretroviral treatment (ART) programme globally and these efforts have been largely financed from its own domestic resources.



## South Africa (2016)

**7.1** million people living with HIV

**18.9%** adult HIV prevalence

**270,000** new HIV infections

**110,000** AIDS-related deaths

**56%** adults on antiretroviral treatment

**55%** children on antiretroviral treatment

Source: UNAIDS Data 2017

# THUSANANG WELLNESS PROGRAMME

The Employee Wellness Programme recognises that short-term personal psychological related problems that may adversely affect an employee's wellbeing and ability to function at work. Involvement in the program will not jeopardise an employee's job security, compensation, promotional opportunities or reputation. If there is any victimisation or discrimination by the employer or colleagues as a result of involvement in the program, the matter will be brought to the attention of the Employee Relation Department and dealt with accordingly.

The Employee Wellness Programme is available to all employees at Tharisa Minerals and has been branded as the THUSANANG Wellness Programme.

Tharisa Minerals believes that healthier employees are more productive, effective and require less expensive medical care and more satisfied with their jobs and their employer. The Thusanang Wellness Programme identifies key areas of focus in terms of employee health and safety and sets forth minimum goals for various stakeholders.

A primary principle of the Thusanang Wellness Programme is to maintain confidentiality throughout every level of the programme.



**Thusanang**

Your Employee Assistance Programme is here for you!

for You, for your Family, for Tharisa

The EAP service is a psycho-social service available for you and your registered dependants.

- Anxiety & stress
- Bereavement
- Child related concerns
- Considering suicide
- Depression
- Domestic violence & abuse
- Family & marital concerns
- Financial planning & assistance
- Illness related concerns
- Sexual assault
- Sleeping disorders
- Substance & alcohol abuse
- Traumatic incidents
- Work related concerns

ALL SERVICES AND CALLS STRICTLY CONFIDENTIAL

Call our 24-hour Call Centre on 0800 203 551 or SMS 082 777 8226 and we will call you back

Calibre Clinical Consultants (Pty) Ltd  
in association with  
Northpark Pharmacy (Pty) Ltd Palms Doctors Inc

Providing Workplace Wellness Solutions



The Thusanang Wellness Programme is here for YOU!  
Counselling, Advice and Services in relation to:

- Post Exposure Prophylaxis (PEP)
- Employee and Family Assistance Programme
- HIV and Wellness

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# SUCCESSFUL WELLNESS INTERVENTION



Wellness Day



Fun Run and Walk



CANSAs Relay



Cup Soup Day



Prostate and Cervical Cancer screening



World AIDS Day



Biggest Loser Challenge

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**THANK YOU**

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