



Vanadium
RESOURCES
L I M I T E D

ASX:VR8

“VANADIUM IN THE BUSHVELD COMPLEX”



- **1 WORLD CLASS**
One of the world's largest vanadium deposits.
Indicated and inferred JORC resource 612 Mt @ 0.78% V₂O₅ in situ incl. 167 Mt @ 1.07% V₂O₅.
- **2 EXCEPTIONAL QUALITY**
Long life open pit mining generates high grade Vanadium concentrate +2% V₂O₅ post beneficiation with low silica / alumina.
- **3 THE BUSHVELD COMPLEX**
Within the famous Bushveld Complex, home to some of the richest deposits word-wide.
- **4 INFRASTRUCTURE**
Close to existing underutilized processing plants.
Power and water nearby with proven road & rail options to port.
- **5 ALL OPTIONS CONSIDERED**
Fast track of studies underway to verify a clear pathway of options through to full V₂O₅ production.
- **6 LICENSE GRANTED – FAST TRACK**
One of few world resources with mining right granted which includes environmental approval.



- ◆ Vanadium Resources has the legal right to 73.95% of the SPD Project.
- ◆ Vendor group of prominent South African mining identities who have joined board.
- ◆ Directors hold ~ 26% of the issued share capital.
- ◆ Balance sheet flexibility – no debt, no encumbrances over project.

Capital Structure

Current Shares	350,110,889
Quoted Options, exercisable at \$0.054 on or before 8 December 2019	51,099,038
Quoted Options, exercisable at \$0.12 on or before 1 Jun 2021	10,000,001
Unlisted Options	64,680,001
Mkt. Cap. at 8c	~\$28,400,000
Cash at 30 Jun 2019	~\$1,500,000

* Currently owns 50%, with final 23.95% interest subject to section 11 approval by the Department of Mineral Resources

* Fully paid ordinary shares restricted for 24 months from 3 November 2017. 1,957,725



A stand-out amongst all peers

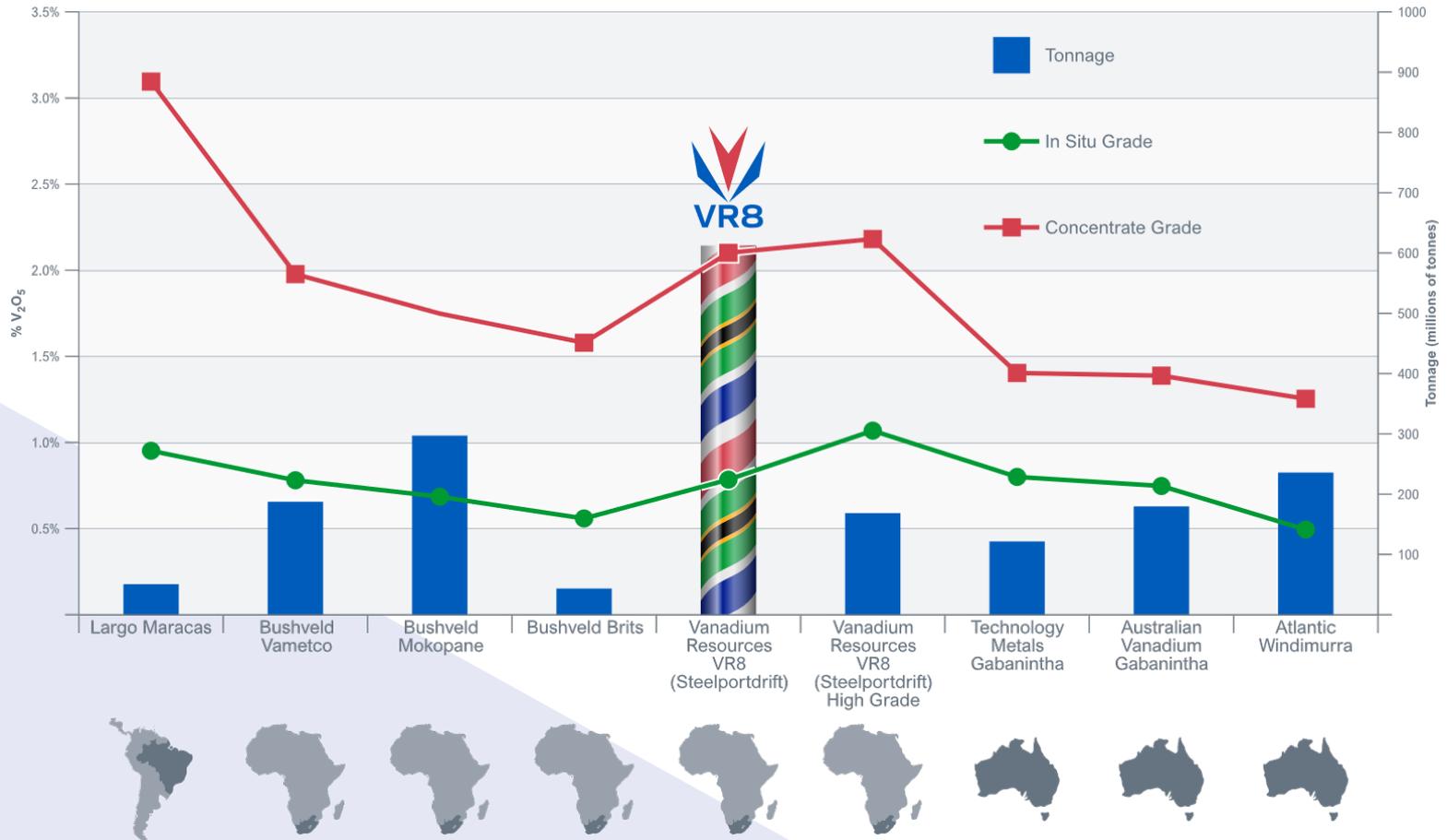


Chart compares resources reported under different codes and companies at different stages of development as detailed in slide 31. Only resources with a quoted in situ grade > 0.45% V₂O₅ are shown in figure.



Focused Management

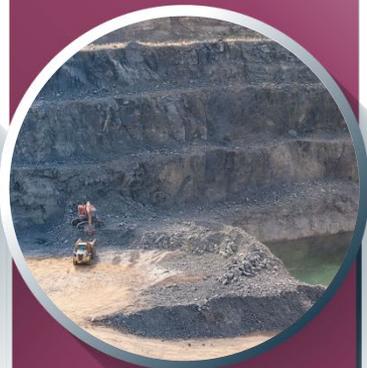


FAST TRACK



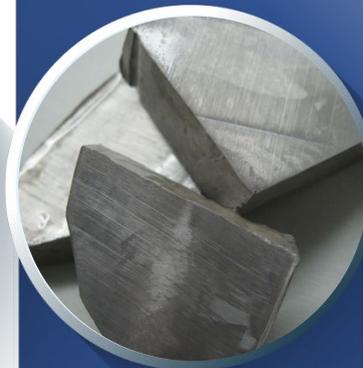
Fast track of the resource ready for development or the utilization of nearby underutilized plant that could be modified for early production

NEXT TO MINE



Create the World's next Vanadium mine able to compete on a global scale. The granting of a mining license (mining right) a major advantage

VALUE ADD



Pursue all possibilities for value adding from concentrate through to high purity V_2O_5

PARTNERS



Begin early development and partnerships for reciprocal partnerships in steel, alloys and battery technology



Located in the Bushveld Complex

Steelpoortdrift is part of a geologically unique igneous complex endowed with deposits of PGEs, chromium, vanadium and magnetite. This world-renowned mining location is host to several mining operations and multiple major mining companies are active in the area.

Other Mines in the Bushveld Complex

Bushveld Minerals Vametco Vanadium Mine
Mokopane Vanadium Project.

Xstrata
Rhovan Vanadium Mine.

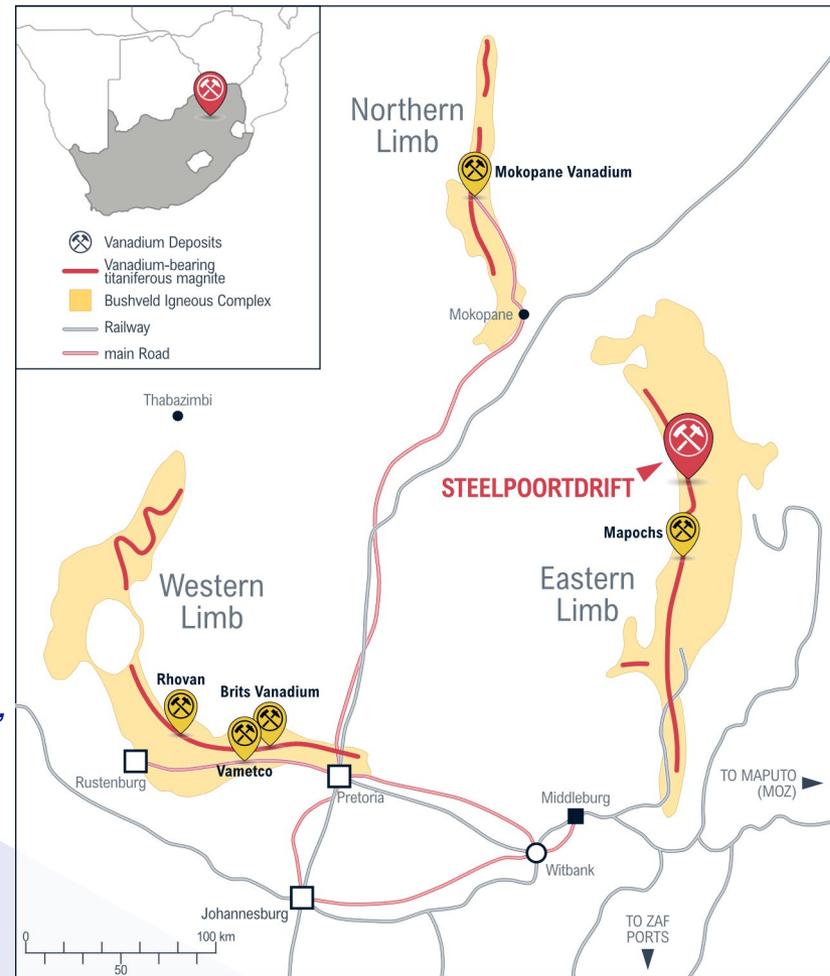
Anglo American
Twickenham PGE Mine, Modikwa PGE Mine, Kroondal PGE Mine, Bokoni PGE Mine, Mogalakwena PGE Mine, Polokwane Smelter, Waterval Smelter.

African Rainbow
Modikwa PGE Mine, Two Rivers PGE Mine.

Sibanye Stillwater Marikana PGE Mine.

Impala Platinum Rustenburg PGE Mine.

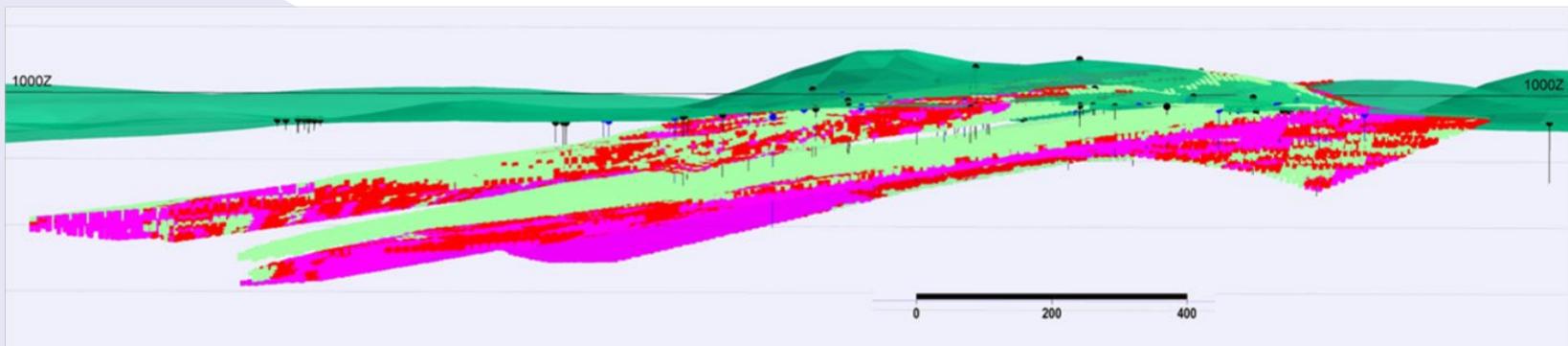
Samancor Tubatse Chrome Operations, Mooinooi.





Outstanding Mineralisation

- ◆ Steelpoortdrift Project located in the Bushveld Complex, **one of the most studied geological provinces in the world.**
- ◆ Vanadiferous titanomagnetite layers occur at the same stratigraphic level across the entire complex and can be traced for almost 400 km.
- ◆ Vanadium mineralisation in the Bushveld Complex is **higher grade than global peers** (with the exception of Largo).
- ◆ The global resource at Steelpoortdrift is one of the largest and highest grade (in-situ) mineral resources within the Bushveld Complex (indicated and Inferred) and at 169 Mt the high-grade resource is **the largest globally above 1% V2O5.** ⁽¹⁾
- ◆ Mineralisation outcrops at surface meaning amenable to open pit mining.
- ◆ Mineralisation dips shallowly (~10°) meaning less waste to mine, **low strip ratios and cheaper mining cost.** ⁽²⁾
- ◆ Scoping Study has defined initial production target of 53.4Mt which corresponds to 25 year mine life at 2.2Mtpa. ⁽³⁾



¹ Refer ASX Announcement 16 April 2019

² Refer ASX Announcement 2 May 2019

³ Refer ASX Announcement 2 May 2019



Excellent Oxide Zone Results

- ◆ Mineralisation outcrops or subcrops across project, with weathering < 10m.
- ◆ Amenable to open pit mining with an initial 25-year mine life defined.
- ◆ Unlike many deposits, weathered mineralisation behaves no differently to fresh mineralisation in processing tests to date.
- ◆ Concentrate results from both mineralisation sources contain identical V_2O_5 contents. ⁽¹⁾



¹ Refer ASX Announcement 5 August 2019.



Impressive Reported JORC

- ◆ High grade Mineral Resources drilled to a high level of confidence (Indicated and Inferred categories).
- ◆ Global Mineral Resource of 612 million tonnes above a 0.45% V₂O₅ cut-off.
- ◆ High grade Mineral Resource of 169 million tonnes above a 0.9% V₂O₅ cut-off.

Refer to ASX Announcement 16 April 2019 for full details including information prescribed by the JORC Code.

The Company is not aware of any new information that materially affects the information in that announcement or the Mineral Resource.

Mineral Resource by Category

Category	Tonnes (Mt)	Whole Rock V ₂ O ₅ %
Indicated	231	0.78
Inferred	380	0.77
TOTAL	612	0.78

Mineral Resource by Grade

V ₂ O ₅ Range	Category	Tonnes (Mt)	Whole Rock V ₂ O ₅ %
> 0.90%	Indicated	68	1.05
> 0.90%	Inferred	102	1.09
Sub Total	> 0.90%	169	1.07
0.45%–0.90%	Indicated	164	0.68
0.45%–0.90%	Inferred	279	0.65
Sub Total	0.45%–0.90%	442	0.66
TOTAL		612	0.78



Comprehensive Test Results

- ◆ Plant trials show + 2% V_2O_5 concentrate can be produced using simple beneficiation processes.
- ◆ Excellent mass recovery across mineralised intervals, increasing to + 40% in higher grade zones (+ 1.0% V_2O_5).
- ◆ Concentrate analysis is very consistent in vanadium and titanium content throughout the mineralised intervals, with low levels of silica and alumina.
- ◆ High grade concentrate means less waste is present to interfere in processing.

Sample	V_2O_5 %	TiO_2 %	SiO_2 %	Al_2O_3 %	Fe %
3357	2.19	12.0	3.25	4.82	54.6
3358	2.18	12.1	3.51	4.91	54.2



* Refer ASX Announcements 14 Jan, 29 Jan, 18 Mar and 5 Aug.



Value-Add Testing Progressing

- ◆ Plant trials show +2% V_2O_5 concentrate can be produced using simple beneficiation processes. ⁽¹⁾
- ◆ Further work planned to identify other value adding possibilities such a pelletisation.
- ◆ Test work planned to produce Ammonium Metavanadate (AMV) and V_2O_5 .



Chinese test facility visited by Mastermines in December 2018. One of several test facilities and processes under consideration. VR8 plans to test the full suite of value adding options available. In addition to the supply of high grade concentrate, the company will explore all options and their relevance to potential partner needs.

¹ Refer ASX Announcement 18 March 2019.



All Options to be Explored

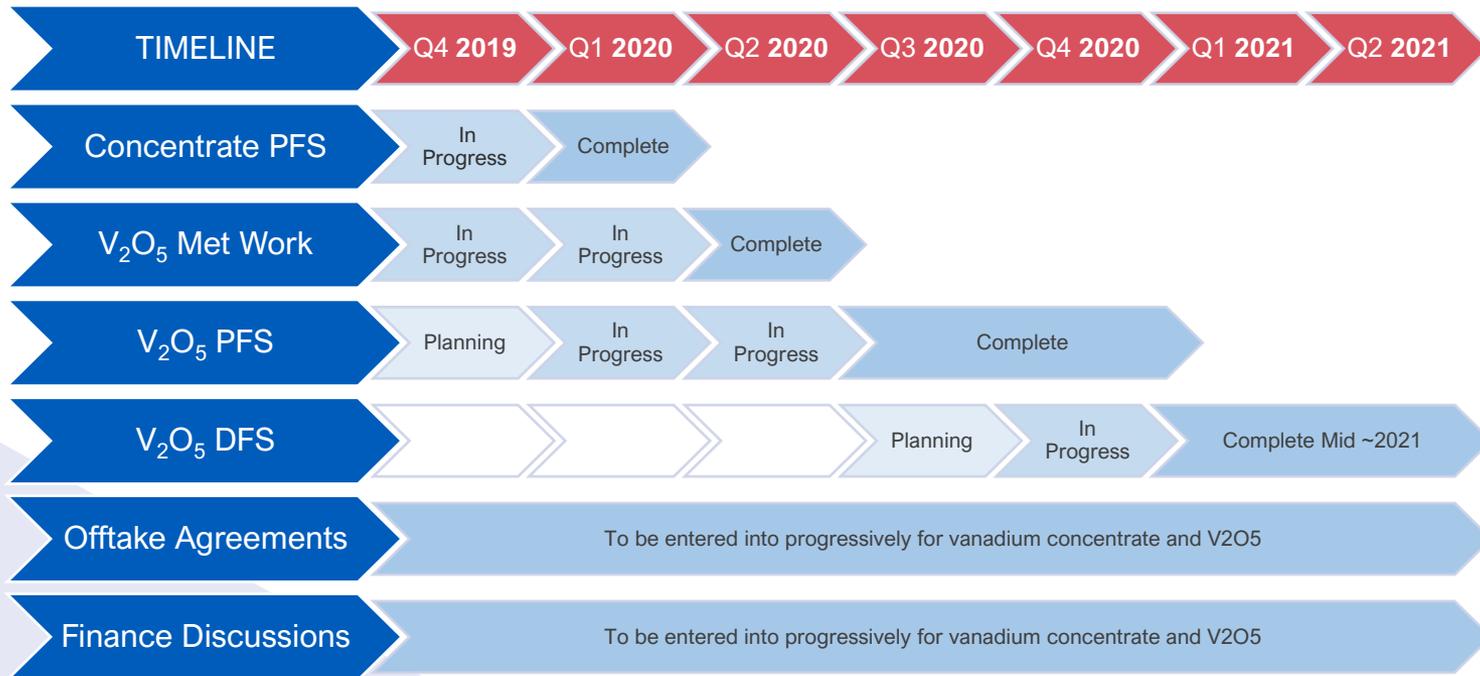
Test-work will investigate established processing techniques (salt roasting) along with **hydrometallurgical techniques** and more conceptual “direct attack” methods.

- ◆ Current studies into processing of concentrate to produce >98% V_2O_5 product (standard specifications) or higher purity V_2O_5 products.
- ◆ Studies into downstream processing options to be accelerated during 2019.
- ◆ Goal is to pursue “low CAPEX” options.





Aggressive Development Plan



Note: See page 15 for production detail

Discussions for offtake agreements are currently targeting multiple partners for both vanadium concentrate and V2O5 over the full period.

Discussions for finance will form part of discussions with partners and may also include traditional debt funding or both options.

Realistic timelines for construction and production will be added when multiple suitable partners and finance agreements are closer to completion.

The targeted periods will rely upon adequate investor or partner interest to fast-track the proposed timelines.

The mining right, environmental management plan and social and labour plans are all in place avoiding potentially long permitting delays



- ◆ Beneficiation plant to produce a V205 concentrate would provide the front-end for V205 production and could be operated independently
- ◆ Contract beneficiation facilities could be utilized while the process plant is under construction.
- ◆ Production of concentrate intended to precede production of V205 dependent on offtake agreements and financing
- ◆ Detailed production timelines will be provided in future updates.



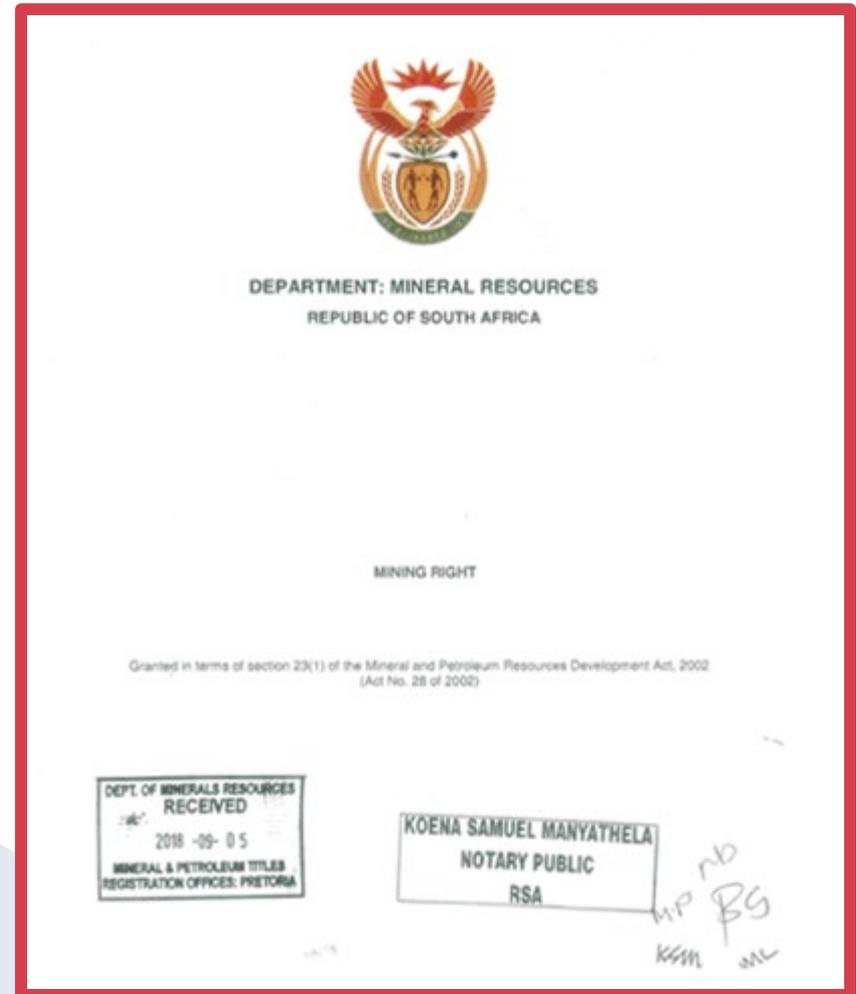
Permitting Completed :

Mining Right
Approved

Environmental Management Plan
Approved

Social and Labour Plan
Approved

- ◆ The Steelpoortdrift Vanadium Project is covered by a granted Mining Right.
- ◆ The Mining Right remains in force until September 2048.
- ◆ The Mining Right includes approval of the Environmental Management Plan and Social & Labour Plan for the Project.





China Committed to S.A

Prominent Chinese mining companies have strong presence in South Africa through both direct investments or acquisitions of mines in South Africa.



JINCHUAN 金川



PENGXIN
鹏欣集团



SINOSTEEL

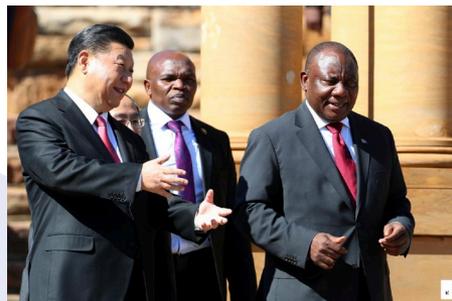


中国五矿集团公司
CHINA MINMETALS CORPORATION



中信金属有限公司
CITIC Metal Co., Ltd.

- ◆ Prominent Chinese mining companies have strong presence in South Africa through both direct investments or acquisitions of South African mines.
- ◆ China's commitment to invest in infrastructures in Africa, making China EPC companies readily available for engagement.
- ◆ Xi also pledges to invest \$14.7b in South Africa in 2019.
- ◆ Recently, more than 40 major companies signed 93 cooperation agreements with their South African counterparts worth R27 billion.



中国中冶



SINOMA
中国中材



China Committed to S.A

EMSEZ is a large scale bilateral industrial agreement between China and South Africa. The project has already attracted RMB10 billion potential investment from prominent Chinese companies.



- ◆ EMSEZ is a fully integrated metallurgical industrial park which has planned capacities of:
 - ◆ 5 Mtpa Metallurgical Grade Lime.
 - ◆ 3 Mtpa High Carbon Ferrochrome.
 - ◆ 3 Mtpa Stainless Steel.
 - ◆ 1.2 Mtpa Titanium Dioxide.
 - ◆ 1 Mtpa Ferromanganese Plant.



陕西中兴恒泰投资控股有限公司



TENGY 天洁集团



ZHEJIANG ENERGY
浙江能源



Huge Local Infrastructure Advantage



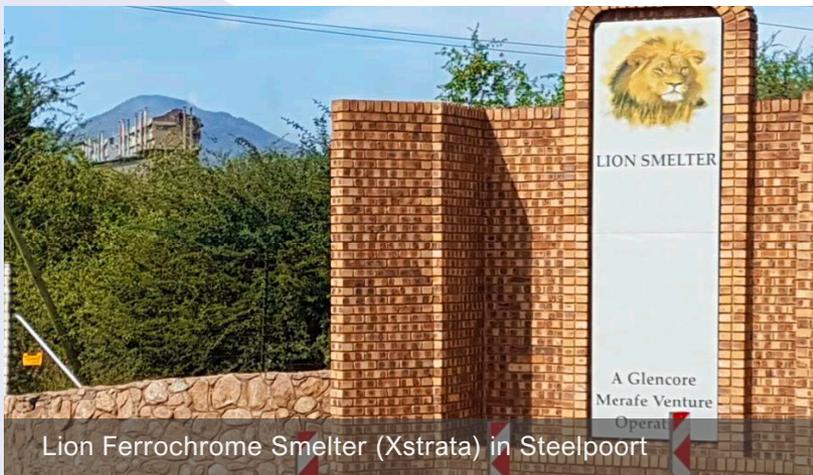
ESKOM sub station, 12km from project



Platinum refinery in Bushveld Complex N of Steelport



De Hoop Dam 15km from project



Lion Ferrochrome Smelter (Xstrata) in Steelport



Steelport Rail Siding 30km from project



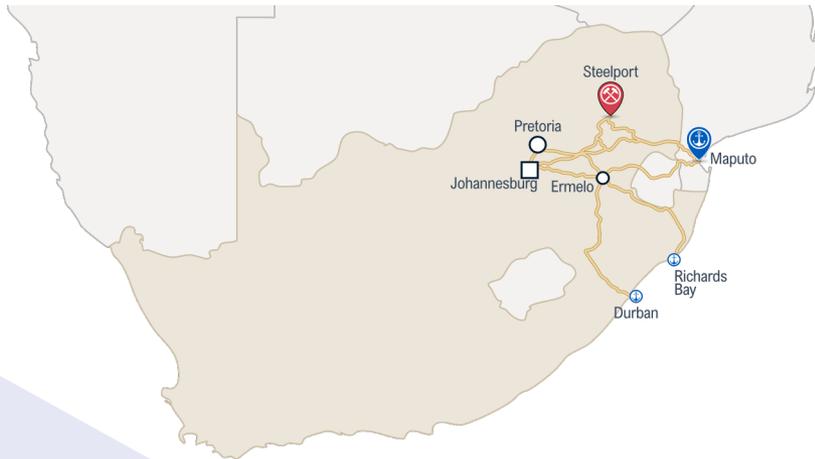
Community Relations Matter



- ◆ Vanadium Resources has maintained a positive relationship with local communities since project inception.
- ◆ A dedicated local community relations officer has been involved in the project since March 2018.
- ◆ Recent community meetings reaffirmed the communities' support for the project.
- ◆ Social and Labour Plan has been Approved as part of the granting of the mining lease.
- ◆ Vanadium Resources is committed to facilitating and supporting a SIP (Social Investment Plan) for the local communities.



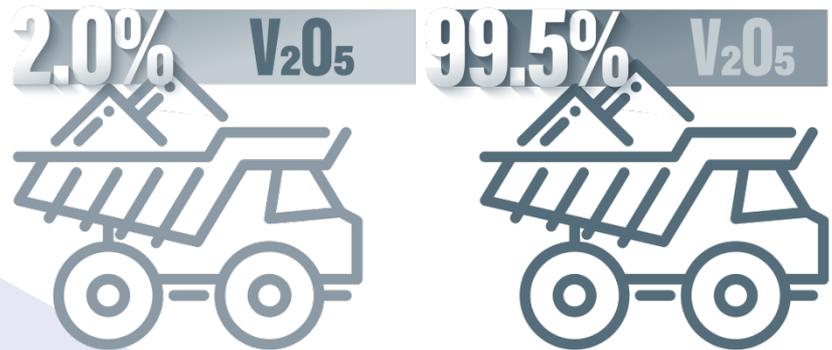
Proven Existing Port Access



- ◆ Existing and proven transport from the Steelpoortdrift resource.
- ◆ Road or rail options.
- ◆ Possibility for initial shipment of +2.0% V_2O_5 ore concentrate.
- ◆ Possibility to further process in-country and value add to 99.5% V_2O_5 and reduce shipping costs.



Port to... China
20 DAYS





Experienced Management



Bill Oliver — Managing Director

Geologist with over 20 years wide ranging experience in a range of commodities and jurisdictions including bringing African projects into production. Enviably track record in project identification and evaluation.



Pat Burke — Non-Executive Chairman

Lawyer with extensive legal, commercial and corporate advisory experience for ASX listed companies. Has acted as a director for a number of ASX and AIM listed small to mid-cap resources companies over the past 15 years.



Nico van der Hoven — Director

Businessman and entrepreneur with over 29 years' experience in exploration and mining, having co-founded and operated 5 mines over this period. Nico is also the founding member of Herculite Chrome, Bauba Resources Ltd (BAU.J), Vanadium Resources (Pty) Ltd and GoldStone Resources Ltd (GRL.L). He currently acts as Chairman of Bauba Resources Ltd, an active chrome mining company and platinum explorer.



Jurie Wessels — Director

23 years' experience in the exploration industry exploring for various minerals in Africa, South America and Europe and practising as a minerals lawyer. Co-founded a number of exploration and mining companies including Bauba Resources Ltd (BAU.J), Orange-River Pegmatite (Pty) Ltd, GoldStone Resources Ltd (GRL.L) and Vanadium Resources (Pty) Ltd.



Real Mining Experience

South African based directors Nico van der Hoven and Jurie Wessels were responsible for the establishment and development of Bauba Resources Ltd, an active chrome mining company in the Bushveld Complex.

- ◆ Both have hands-on, local, experience in mining, beneficiation and shipping to export markets that will be invaluable in progressing the project.
- ◆ In addition, Nico brings skills with exposure to marketing and trading a wide range of commodities including negotiating offtake agreements.
- ◆ Nico has co-founded and operated 5 mines in Southern Africa in the last 25 years.





Access to Specialist Skills

METS South Africa (Pty) Ltd (SA)
Process design and costing



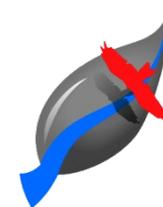
ENC Minerals (Pty) Ltd (SA)
Design and management of metallurgical test-work



Sound Mining (Pty) Ltd (SA)
Engineering, mine planning and design



Red Kite Consulting (Pty) Ltd (SA)
Environmental management and consulting



Geoactiv (Pty) Ltd (SA)
Geology, exploration and drilling



GEMECS (Pty) Ltd (SA)
Database management, resource modelling



Mining Plus Pty Ltd (AU)
Resource modelling, mine planning and design

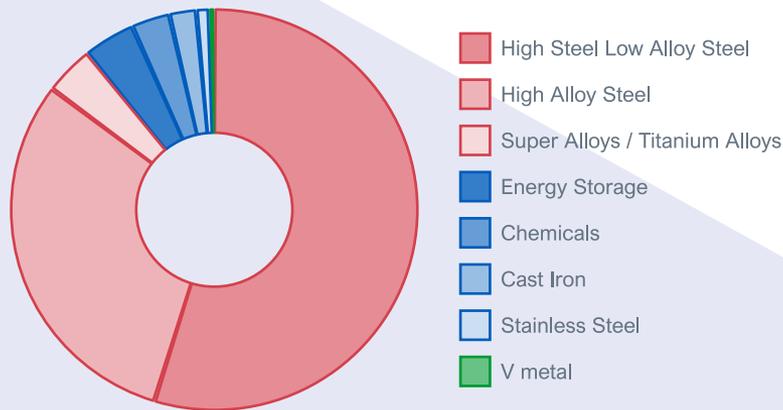
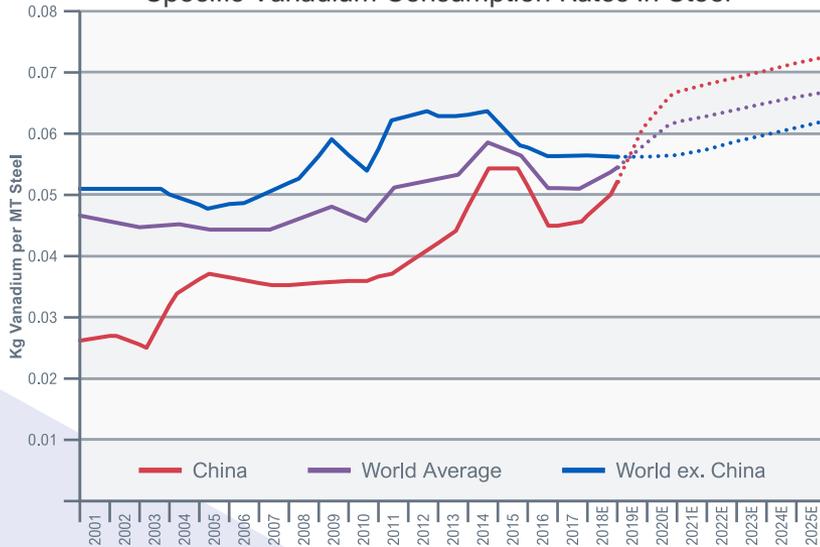


Mastermines (AU, HK)
Marketing & Asia market consultants





Specific Vanadium Consumption Rates In Steel



- ◆ Inventories low, additional demand will impact pricing as witnessed during 2018.
- ◆ Recent falls from the 2018 high suggest that low pricing will be maintained at higher levels than historical lows and remain commercially strong.

Vanadium (V_2O_5) Price Chart



Source: TTP Squared, Metal Bulletin

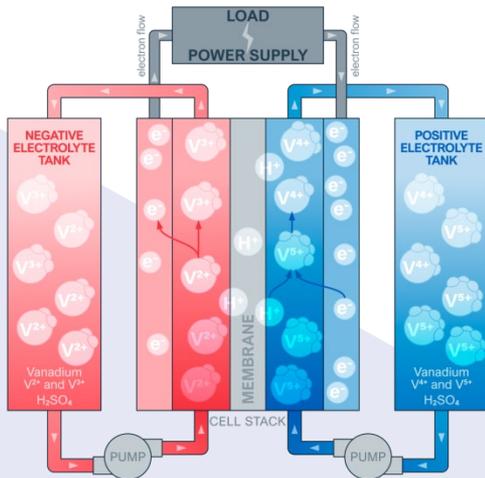


- ◆ Over 90% of the current demand for vanadium arises from its use to strengthen steel and alloys.
- ◆ Demand increasing due to more stringent regulations in China for rebar and other steel products used in construction. While implementation has been slower than expected, inspections are set to continue during 2019.
- ◆ China recently has perfected the manufacture of high-performance alloys resulting in strong growth in the sector.
- ◆ Supply of new lightweight alloys increasing in the aerospace industry. All new Boeing Dreamliner 787 and Airbus A350 now incorporate vanadium in light weight alloys up to 100 tons per aircraft.





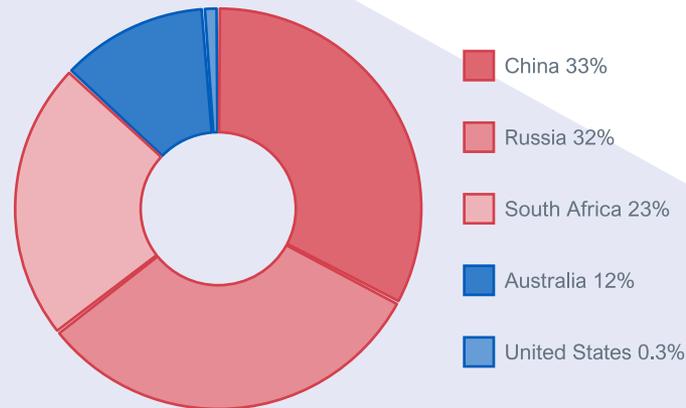
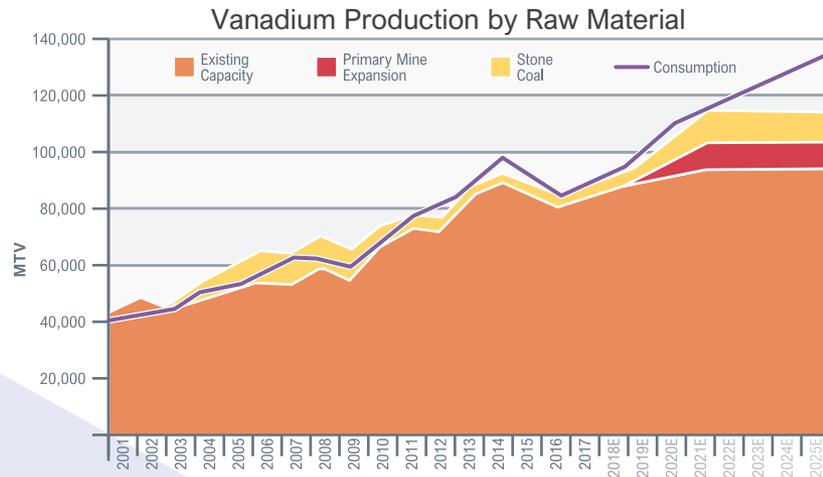
- ◆ Forecasters expect over 1,200GW of battery capacity to be added between today and 2050, with approx. 600GW before 2025. ¹
- ◆ VRFBs forecast to represent between 15 and 25 % of battery capacity.
- ◆ Could add up to 10,000mtV of demand into an already undersupplied market. ²



Dalian City, China has signed a syndicated loan agreement to fund the first stage of a 200/800MWh vanadium battery. The first stage of the project is planned to be 100/400MWh and estimated to be complete by mid 2020.

¹ BloombergNEF, New Energy Outlook 2018; International Energy Agency, World Energy Outlook 2018

² Noack et. al, 2016. Techno-economic modelling of RFB Systems (Energies 2016, 9, 627) Vanadium Flow Batteries: An In Depth Analysis. EPRI, Palo Alto, CA: 2007.1014836



- ◆ Over 85% of the world’s vanadium is produced from China, Russia and South Africa.
- ◆ Chinese domestic production is largely from polluting sources (stone coal) or low-grade resources.
- ◆ Stringent implementation of Chinese environmental standards place serious doubts on the future of many Chinese stone coal resources.
- ◆ South Africa has become a major recipient of mining investment by major Chinese mineral and metal suppliers. A combination of higher grade and lower opex bodes well for quality undeveloped resources.



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The information in this announcement that relates to Exploration Results and other technical information relating to drilling and sampling at the SPD Vanadium complies with the 2012 Edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (JORC Code) and has been compiled and assessed under the supervision of Mr Nico Denner, the principal of GEMECS (Pty) Ltd, consultants to the Company. Mr NJ Denner is a Fellow of the Geological Society of South Africa (GSSA) and a member of good standing of the South African Council for Natural Scientific Professions (SACNASP), both Recognised Professional Organisations under the JORC Code.. Mr NJ Denner is a geologist with 24 years' experience in the South African Mining Industry and has sufficient experience that is relevant to the style of mineralisation and type of deposit under consideration and to the activity being undertaken to qualify as a Competent Person as defined in the 2012 Edition of the JORC Code. Mr Denner consents to the inclusion in this announcement of the matters based on his information in the form and context in which it appears.

The information in this announcement that relates to Mineral Resources, including the Mineral Resources contained within the Production Target, complies with the 2012 Edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (JORC Code) and that has been compiled, assessed and created by Mr Kerry Griffin BSc.(Geology), Dip Eng Geol., a Member of the Australian Institute of Geoscientists and a Principal Consultant at Mining Plus Pty Ltd, consultants to the Company. Mr Griffin has sufficient experience that is relevant to the style of mineralisation and type of deposit under consideration and to the activity being undertaken to qualify as a Competent Person as defined in the 2012 Edition of the JORC Code. Mr Griffin is the competent person for the resource estimation and has relied on provided information and data from the Company, including but not limited to the geological model and database. Mr Griffin consents to the inclusion in this announcement of matters based on his information in the form and context in which it appears.

PEER COMPARISON INFORMATION



Company	Code	Project	Stage	Resource Category	Resource Tonnes	Resource Grade	Concentrate Grade	Information Source
Largo	LGO.TSX	Maracas	Production	Measured, Indicated & Inferred (43-101)	49.25	0.99	3.10	43-101 Technical Report dated 26/10/2017 largoresources.com/operations/maracas-menchen-mine
Bushveld	BMN.LSE	Vametco	Production	Indicated & Inferred	187	0.78	1.98	bushveldminerals.com/bushveld-vametco/www.bushveldminerals.com/presentations/
		Mokopane	Development	Indicated & Inferred	298	0.68	1.75	Mokopane PFS Study Report Jan 2016 bushveldminerals.com/technical-reports/
		Britts	Exploration	Indicated & Inferred	67	0.56	1.58	AIM Announcement 16/07/2019 http://www.bushveldminerals.com/brits-vanadium-project-2/
Vanadium Resources	VR8.ASX	Steelpoortdrift	Development	Indicated & Inferred	612	0.78	2.18	ASX Announcement 16 April 2019
TNG	TNG.ASX	Mt Peake	Development	Measured, Indicated & Inferred	160	0.28	1.20	ASX Announcement 26/03/2013
King River	KRR.ASX	Speewah	Development	Measured, Indicated & Inferred	4,712	0.30	2.11	ASX Announcement 02/11/2018 21/03/2018
Pursuit	PUR.ASX	Koitelainen Vosa	Development	Inferred	116.4	0.28	2.25	ASX Announcement 06/02/2019
		Airijoki	Development	Inferred	44.3	0.40	1.70	ASX Announcement 08/03/2019
Aust Vanadium	AVL.ASX	Gabaintha	Development	Measured, Indicated & Inferred	176	0.77	1.4	ASX Announcement 26/09/2018, 19/12/2018
Technology Metals	TMT.ASX	Gabaintha	Development	Indicated & Inferred	120	0.8	1.39 – 1.49	ASX Announcement 21/06/2018
Atlantic	Private	Windimurra	Development	Measured, Indicated & Inferred	235	0.49	1.26	https://atlanticptyltd.com.au/projects/windimurra/geology-reserves-resources



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