

Strategic Commodity Focus Iron Ore, Vanadium & Titanium Development Projects

> Investor Presentation May 2021

O Important Information

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TECHNOLOGY

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#### **Competent Person's Statement**

The information in this report that relates to Exploration Results are based on information compiled by Mr John McDougall. Mr McDougall is the Company's Exploration Manager and a member of the Australian Institute of Geoscientists. Mr McDougall has sufficient experience relevant to the styles of mineralisation and types of deposits which are covered in this report and to the activity which they are undertaking to qualify as a Competent Person as defined in the 2012 edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves' ("JORC Code"). Mr McDougall consents to the inclusion in this report of the matters based on his information in the form and context in which it appears.

The information in this report that relates to Mineral Resources is based on information compiled by Mr Aaron Meakin. Mr Aaron Meakin is a Principal Consultant of CSA Global Pty Ltd and is a Member and Chartered Professional of the Australasian Institute of Mining and Metallurgy. Mr Aaron Meakin has sufficient experience relevant to the style of mineralisation and type of deposit under consideration and to the activity which he is undertaking to qualify as Competent Person as defined in the 2012 Edition of the Australasian Code for the Reporting of Exploration Results, Mineral Resources and Ore Reserves ("JORC Code"). Mr Aaron Meakin consent to the disclosure of the information in this announcement in the form and context in which it appears.

The information that relates to Ore Reserves is based on information compiled by Mr Daniel Grosso an employee of CSA Global Pty Ltd. Mr Grosso takes overall responsibility for the Report as Competent Person. Mr Grosso is a Member of The Australasian Institute of Mining and Metallurgy and has sufficient experience, which is relevant to the style of mineralisation and type of deposit under consideration, and to the activity he is undertaking, to qualify as Competent Person in terms of the JORC (2012 Edition). The Competent Person, Daniel Grosso has reviewed the Ore Reserve statement and given permission for the publication of this information in the form and context within which it appears.

The information in this report that relates to the Processing and Metallurgy for the Gabanintha project is based on and fairly represents, information and supporting documentation compiled by Mr Brett Morgan and reviewed by Mr Damian Connelly, both employees of METS Engineering Group Pty Ltd. Mr Connelly takes overall responsibility for the Report as Competent Person. Mr Connelly is a Fellow of The Australasian Institute of Mining and Metallurgy and has sufficient experience, which is relevant to the style of mineralisation and type of deposit under consideration, and to the activity which he is undertaking, to qualify as a Competent Person as defined in the 2012 edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves'. The Competent Person, Damian Connelly consents to the inclusion in the report of the matters based on his information in the form and context in which it appears.

#### All currency amounts are in AUD\$ unless stated otherwise.

## Strategic Commodities in a Tier 1 Location

- Yarrabubba Iron-Vanadium Project a near term development project to produce premium iron ore (magnetite) with vanadium credits and titanium by-product.
  - Modest capital expenditure feasibility study underway
  - **Gabanintha Vanadium Project** a large scale, long life, low cost, high purity vanadium development project.
    - DFS completed offtake well advanced, environmental approvals on track, financing discussions progressing.
  - Excellent infrastructure National Highway passes within 30km.
  - Access to **ports** (Geraldton and/or Fremantle) via sealed highway.
  - Granted mining leases.
  - Water supply from northern paleochannel borefield in TMT tenure.
  - Regionally and nationally significant development projects.
  - **Opportunity for staged** development approach to minimise initial capital and maximise benefits for all stakeholders.



ASX: TMT; FRA: TN6

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### **Corporate Overview**

### TMT

ASX Code

### \$54.0m

Market Cap (as at 30 April 2021)

#### **L8.7m** Unlisted Options<sup>1</sup> (various exercise)

### \$7.25m

Cash (as at 31 March 2021)

150.1m Shares on Issue

#### **2.65m** Performance Rights<sup>2</sup>

Includes 12.35m director and employee options – 3.9m vested, 4.1m to vest on GVP FID, 4.35m vest on YIVP hurdles 50% vest on Yarrabubba FID, 50% vest on first production from Yarrabubba

Holder Name	Holding (%) 9.5%			
BNP Paribas Nominees	9.5%			
Great Southern Flour Mills	9.3%			
Retzos Group	5.4%			
Colin David Iles	4.0%			
Station Nominees	3.3%			
Atasa Holdings	3.2%			
TOTAL TOP 20	47.8			

### **Board and Management**



**Ian Prentice Managing Director** 

**Michael Fry** Non-Exec Chairman



Sonu Cheema Non-Exec Director / Co Sec

> **Michael Bourke Project Director**

**Manjot Singh Process Engineer** 

John McDougall **Exploration Manager** 

#### Board & Management holdings - ~9.4% fully diluted







environment safety community





ACKBIRD







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### YARRABUBBA IRON-VANADIUM PROJECT

### PREMIUM IRON ORE PRODUCT INTO A BOOMING MARKET

## **O** Premium Iron (+Vanadium) Magnetite Concentrate

- Large scale testwork confirms high grade, high purity iron ore (magnetite) product.
  - Delivers **64.3% Fe (MASFR1) and 62.6% Fe (MASFR2)** at 125 micron grind size (average 63.4% Fe).
  - Premium product **expected to deliver premium pricing**.
  - Weighted average grade of **62.8% Fe and 1.66% V<sub>2</sub>O<sub>5</sub>** at 75-micron grind size with **mass recovery of 49.6%** (flowsheet design basis).
- Low levels of deleterious elements at weighted average 0.62% SiO<sub>2</sub>, 0.96% Al<sub>2</sub>O<sub>3</sub>, 0.017% S and 0.001% P.
- Ore Reserve of 9.4Mt at 45.3% Fe and 0.97%  $V_2O_5$ .
- Mineral Resource of 27.7Mt at 38.7% Fe and 0.9%  $V_2O_5$ .



# **Near Term, Low Risk Development Project**



- Simple crushing, milling and beneficiation (CMB) flowsheet to deliver high purity iron ore (magnetite) product at 75 - 90 micron grind size.
- Key differentiators for Yarrabubba:
  - $\checkmark$  High in-situ iron grades
  - $\checkmark$  Very high mass recoveries
  - $\checkmark$  Low risk processing
  - $\checkmark$  Simple open pit mining
  - ✓ High quality product
- Gabanintha DFS provides significant advantage in progressing the development of Yarrabubba.
- CMB circuit to be built at Gabanintha benefitting the long term Project development.
- Staged development strategy complementary to Gabanintha.





# **Titanium (Ilmenite) By-Product**

- Testwork on larger scale non-magnetic tails (MASFR1 and MASFR2) delivered an indicative specification for a titanium by-product (YIP1) containing 46 to 47% TiO<sub>2</sub>.
- Deleterious elements  $Fe_2O_3$ ,  $Nb_2O_3$ ,  $P_2O_5$  and U+Th generally well below comparable products, but elevated  $Cr_2O_3$  and  $V_2O_5$ .
  - High titanium recovery achieved using standard gravity separation processing; the gravity product upgraded with magnetic separation.
  - Industry consultants TZMI completed a product quality review and estimated YIP1 will achieve US\$140 – US\$180/tonne FOB (real 2020) in the medium term.
  - Optimisation testwork has opportunity to further enhance YIP1 quality and refine the titanium separation flowsheet.



## **Sinosteel Australia Letter of Intent**

- Sinosteel Australia part of the WA business community since 1991.
- Lol covers negotiation of a life-of-mine iron-vanadium offtake.
  - Annual quantity of up to 1.5Mtpa
- EPC contract to be negotiated with Sinosteel Equipment & Engineering Co., Ltd (MECC).
- Technical collaboration with MECC supported development of indicative CMB flowsheet.

"Sinosteel Australia is very pleased to have established this relationship with Technology Metals Australia and aim to progress our offtake and EPC contract discussions on the premium quality Yarrabubba Iron-Vanadium Product based on the principles of mutual benefit and respect" Sinosteel Australia Managing Director David Sun





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- Iron ore prices (62% Fe, CFR China) have increased from US\$63/t to US\$180/t over last 12 months.
- China produced 1.05 Bn tonnes steel in 2020; MQ21 output 15% higher than MQ20. Mills increasing output on highprofit margins despite government environmental rules.
- Iron ore producers struggled to keep up with strong demand in MQ21 due to operational challenges and weather issues.
- Prices for 63.5% Fe iron ore (delivery Tianjin) up to >US\$190/t. Premiums for higher purity increasing due to desire for higher quality with lower environmental emissions.
- High grade iron ore with Fe >63.5% is set to expand by 17.5% over the decade of the 2020s and attract higher prices than standard and lower grade iron ore (Fastmarkets, April 2021).
  - Customers are willing to pay a premium for higher grade iron ore with lower impurities such as alumina and silica.



# **Yarrabubba Development Activities**

- Workstreams in support of Yarrabubba development :
  - Diamond drilling to generate bulk sample, geotechnical data and resource infill **done;**
  - Preparation of bulk sample composites underway;
  - Gabanintha Environmental Review Document draft submitted, initial review underway;
  - Evaluation of logistics, haulage routes, port draft report done, options analysis progressing;
  - Definition of process flowsheet indicative CMB flowsheet defined, titanium circuit progressing;
  - Resource infill/extension RC drilling commence late May;
  - Resource estimation, upgrade scheduled July/August;
  - Pilot scale testwork, customer sample generation scheduled for June/August;
  - Preparation of Yarrabubba environmental submissions to progress Mining Approvals.



Yarrabubba Project Flyover

### GABANINTHA VANADIUM PROJECT One of the Highest Grade Undeveloped Vanadium

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SODa

**Deposits in the World** 



## **World Class Resource – Simple Open Pit Mining**

- Mine life of 16 years on Ore Reserve of 29.6Mt at  $0.88\% V_2O_5$ .
- Average annual production of 27.9Mlb delivering premium +99% purity product at lowest cost quartile operating costs.
- High grade mineral resource of 60.7Mt at 1.1% V<sub>2</sub>O<sub>5</sub> within total mineral resource of 109.5Mt at 0.8% V<sub>2</sub>O<sub>5</sub>.
- Crusher feed in excess of  $1.0\% V_2O_5$  for at least first 12 years.
- Ore body characterised by very shallow oxidation profile.
- Open pits limited by drilling at depth and on strike to the south.





## Shallow Oxidation – Consistent High Grade Basal Unit









Annual Crusher Feed Showing Feed Grade and Tonnage plus Distribution of Inferred Mineral Resources

(Process feed post 2034 sourced from low grade stockpiles built up over LOM – to be displaced with high grade feed from Southern Tenement)

1RAGEXTMINASKRAMOUNCement dated 21 August 2019 for full details of the Definitive Feasibility Study

Grade (V<sub>2</sub>O<sub>5</sub>%

# **Pilot Test Work De-Risks Project and Confirms Scalability**



#### CONFIRMS VERY HIGH YIELD TO MAGNETIC CONCENTRATE



11.5T bulk sample processed through Crushing Milling Beneficiation pilot plant

Confirmed very high yield to magnetic concentrate with low deleterious elements



#### PILOT SCALE KILN TESTWORK CONFIRMS VERY HIGH RECOVERY RATES

7.5T of magnetic concentrate processed through pilot scale rotary kiln delivered average vanadium recovery of 88.6%

Confirms end-to-end vanadium recovery of 77% for fresh massive magnetite ore



#### DFS INCORPORATES KILN DESIGN AND OPERATING PARAMETERS

Pilot scale continuous salt roast / kiln testwork completed by kiln experts FLSmidth

FLSmidth provided kiln design and operating parameter inputs for DFS

ASX: TMT; FRA: TN6

### Customer / Partner Engagement

#### **CNMNC a subsidiary of China Nonferrous Metal Mining Group Company.**

- Binding take-or-pay offtake for 2,000Tpa
   (4.4Mlb pa) ~16% of annual production.
- Three year term with three-year extension.
   Shaanxi Fengyuan offtake MOU over
   3,000Tpa.
- Take-or-pay ~24% of annual production.
- Five-year term with five-year extension.
- Big Pawer offtake MOU over 1,000Tpa take-orpay and up to 5,000 Tpa

E System technical collaboration and downstream electrolyte production MOU.

6,000 to 10,000 tonnes of TMT's proposed production of 12,800Tpa  $V_20_5$  covered under Binding Offtake and MoU

# **O** Project Development Partners



**NIDTH** 

- Western Australian Government Lead Agency Support - Future Battery Industry strategy supporting downstream processing options.
- NAIF engagement part of strategic funding approach.
- Gabanintha environmental approvals ERD lodged Q1 CY 2021.
- Gas transportation agreement with APA reduces gas transportation costs and facilitates access to emerging Perth Basin gas fields.
- Equipment vendor engagement FLSmidth kiln supply agreement executed.
- Ongoing market engagement for product offtake / funding options – Sinosteel, CNMNC, Shaanxi Fengyuan, Big Pawer, LE System.





### **Investment Case**

- Leveraged to demand for premium iron product and structural change in the vanadium industry.
- Delivering offtake and partner engagement underpinned by high quality technical work.
- ✓ **Globally Significant** low cost, large scale and long life vanadium project.
- ✓ **Stable** operating environment with excellent infrastructure and access to services.
- ✓ **Team in place** focused on progressing the project to maximise shareholder value.



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## APPENDICES

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# Major Use is in Steel – Batteries Rapidly Emerging





- China net importer of vanadium in late
   2019 and throughout 2020.
  - Price environment removed some higher cost / highly polluting Chinese supply.
- Tightening domestic Chinese market due to increased consumption in steel.
- COVID-19 impacts stimulus spending on steel intensive infrastructure.
- Current pricing very supportive of VRFB roll out Dalian, Hokkaido batteries.
- Gabanintha lowest quartile costs at US\$4.04/lb\* V<sub>2</sub>O<sub>5</sub>.
- All In Sustaining Cost estimate of
   US\$5.75/lb V<sub>2</sub>O<sub>5</sub>.

#### V<sub>2</sub>O<sub>5</sub> Cash Cost Curve (Forecast CY2020)



#### TMT operating costs do not incorporate any revenue benefits that may be generated from by-product credits, such as base metal production





- Europe, North America, Japan and India net importers.
- Indian consumption set to grow significantly in near to mid term.
- Currently no production from Australia



- Grid scale stationary storage solutions peak shaving, regulating load frequency, driving grid efficiency.
- Ideally suited to renewable energy contributing to the efficient roll out of green energy able to time-shift large amounts of previously generated energy.
- Lifespan of +20 years with very high cycle life (up to 20,000 cycles) and no capacity loss.
- Can discharge 100% with no performance degradation with excellent long term charge retention.
- Only one battery element vanadium is anode and cathode unique among flow batteries.
- Easily scalable into large MW applications; expandable by simply adding more electrolyte storage capacity.
- Non-flammable enhanced safety.

# **Globally - 113 VRFB Installations and growing**

Number of VRFBs

> 11 VRFBs

6 - 10 VRFBs

I - 5 VRFBs



A . P			
Australia	7	945	4,629.90
Barbuda	I.	3,000	12,000.00
Botswana	I.	112	560.00
Canada	3	2,500	10,000.00
China	17	15,825	48,005.00
Czech Rep.	3	47	209.90
Denmark	3	40	260.00
Germany	15	1,530	86,190.00
India	4	155	7 <del>4</del> 0.15
Indonesia	2	400	500.00
Italy		631	2,610.00
Japan	5	2,330	7,481.00
Netherlands	1	10	80.00
Portugal	5	5	60.00
Singapore	I.	250	2,000.00
Slovenia	I.	10	45.00
South Africa	2	745	2,950.00
South Korea		1,250	4,900.00
Spain	4	220	800.00
Sweden	I.	800	1,800.00
Switzerland	2	210	460.00
U. Kingdom		805	5,180.00
USA	17	7,418	33,173.70
Austria	I.	14	84.00
Kenya	I.	140	84.00
Slovakia	2	107	640.00
UAE	1	10	40.00
Taiwan	I.	125	750.00
	1	10	40.00

VREBs KW KWh

VANITEC ¥\_4\* TRANSFORMING POSSIBILITIES World's Largest Battery will be Rongke Power's 200MW/800MWh Vanadium Flow Battery in Dalian China (Double the size of Australia's South Australian Li-ion battery) **I I 3 VRFB** Installations globaly 209,800 kWh of energy 39,664 kW of power

O I - 1000 kW

Size of VRFBs in Kilowatts

O 1001 - 2000 kW

O> 2000 kW

ASX: TMT; FRA: TN6

# **Australia – 6 Installations, 50MW Battery in Development**

- Australia is adopting VRFBs as a viable alternative to lithium-iron batteries for large scale stationary storage applications.
- A large 50MW/200MWh VRFB battery linked to a 50MW solar farm to be built as part of the Pangea Storage Project in Port Augusta, South Australia.
  - This will be an important point of reference for VRFBs, increasing exposure and proving long lived grid scale application <u>https://www.cellcubeenergystorage.com/cube-press-release-5142019</u>.

	Size	Location	Company	Year	Site	Standalone / Network			
)	30kW, 130kWh	Sydney, NSW	CellCube	2015	University of NSW	Standalone			
	10kW, 100kWh	Busselton, WA	VSUN	2016	Native tree nursery	Standalone			
	25kW, 100kWh	Perth, WA	Protean Energy	2018	Industrial site	Standalone			
	80kW, 320kWh	Meredith, VIC	VSUN	2019	Dairy Farm	Standalone			
	20kW, 80kWh	Packenham, VIC	VSUN	2019	Orchard	Standalone			
	180kW, 900kWh	Melbourne, VIC	RedT	2018	Monash University	Network			
)	In Construction /	Construction / Planned							
	50MW, 200MWh	Port Augusta, SA	CellCube	2020	Pangea Storage Project	Network	<ul> <li>Operating</li> <li>Planned</li> </ul>		
	Unknown	East Pilbara, WA	VSUN	2020	Strelly Community School	Standalone			

ASX: TMT; FRA: TN6

## One of te Highest Grade Vanadium Deposits in the World\*

- Global combined resource of 137.2Mt at 38.9% Fe and 0.9% V<sub>2</sub>O<sub>5</sub>
- High grade resource of **75.1Mt at 48.1% Fe and 1.1% V<sub>2</sub>O<sub>5</sub>** in consistent basal massive magnetite
- Gabanintha Vanadium Project Proven and Probable Reserve of 29.6Mt at 0.88% V<sub>2</sub>O<sub>5</sub> at extremely high 98% tonnage conversion
- Yarrabubba Project maiden Probable Reserve of 9.4Mt at 45.3% Fe and 0.97% V<sub>2</sub>O<sub>5</sub>

Material Type	Classification	Mt	V <sub>2</sub> O <sub>5</sub> %	Fe%	$Al_2O_3\%$	SiO <sub>2</sub> %	TiO₂%	LOI%	<b>P%</b>	<b>S</b> %
	Measured (North)	1.2	1	44.7	6.2	10.4	11.4	0	0.009	0.2
	Indicated (North)	18.5	1.1	49.1	5.2	5.8	12.9	-0.1	0.007	0.2
	Indicated (South)	7.3	1.1	49.2	5.1	5.8	12.6	-0.6	0.004	0.3
Massive	Total Indicated	25.8	1.1	49.1	5.1	5.8	12.8	-0.3	0.007	0.2
Magnetite	Inferred (North)	41	1.1	47.7	5.6	7.1	12.6	0.3	0.008	0.2
	Inferred (South)	7.1	1.1	46.9	5.6	7.4	12.1	0.5	0.005	0.3
	Total Inferred	48.1	1.1	47.6	5.6	7.2	12.5	0.3	0.008	0.2
	Massive Global	75.1	1.1	48.1	5.5	6.8	12.6	0.1	0.007	0.2
	Indicated (North)	10.3	0.6	28.6	13.1	25.5	7.5	3	0.03	0.2
	Indicated (South)	2.3	0.7	33.1	9.5	20.6	8.5	2.3	0.014	0.3
Disseminated /	Total Indicated	12.6	0.6	29.5	12.5	24.6	7.7	2.8	0.027	0.2
Banded	Inferred (North)	38.5	0.5	27.1	12.7	27.4	6.9	3.3	0.027	0.2
Magnetite	Inferred (South)	11	0.6	27.7	13	25.9	7	2.7	0.015	0.3
	Total Inferred	49.5	0.5	27.2	12.8	27.1	6.9	3.2	0.024	0.2
	Diss / Band Global	62.1	0.6	27.7	12.7	26.6	7.1	3.1	0.025	0.2
Combined	<b>Global Combined</b>	137.2	0.9	38.9	8.7	15.7	10.1	1.5	0.015	0.2

\*Note: The Mineral Resources were estimated within constraining wireframe solids using a nominal 0.9% V<sub>2</sub>O<sub>5</sub>% lower cut-off grade for the massive magnetite zones and using a nominal 0.4% V<sub>2</sub>O<sub>5</sub>% lower cut-off grade for the banded and disseminated mineralisation zones. The Mineral Resources are quoted from all classified blocks within these wireframe solids above a lower cut-off grade of 0.4% V<sub>2</sub>O<sub>5</sub>%. Differences may occur due to rounding.

- Refer TMT ASX announcements dated 29 March 2019 and 1 July 2020 for full details of the mineral resource estimation.

MINING RESERVE

@ 0.88% V<sub>2</sub>O<sub>E</sub>

# **Gabanintha Vanadium Processing Flow Sheet**



Gabanintha Schematic Flow Sheet Block Diagram