



**TECHNOLOGY**  
METALS AUSTRALIA LIMITED

# TECHNOLOGY METALS FOR A CLEANER FUTURE

Spark+ Mining Day

14 December 2021



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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 Yarrabubba and Gabanintha projects is based on and fairly represents, information and supporting documentation compiled by Mr Brett Morgan a full-time employee of Technology Metals Australia.. Mr Morgan 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 which he is undertaking, to qualify as a Competent Person in terms of the JORC (2012 Edition). The Competent Person, Brett Morgan consents to the inclusion in the report of the matters based on his information in the form and context in which it appears.

Pursuant to LR-5-19-1 production target and financial forecast: Refer ASX Release - 21 August 2019 for full details of the DFS: Financial Metrics at long term historical average price of US\$8.78/lb V2O5.

Pursuant to LR-5-19-2 production target and financial forecast: The material assumptions as per the ASX release on 21 August 2019 continue to apply and have not materially changed.

# WHY INVEST IN TMT?

**Critical minerals located in a Tier 1 jurisdiction**

## **Murchison Technology Metals Project**

- Comprises two deposits – Gabanintha & Yarrabubba
- Large, long-life high purity vanadium project
- Lowest cost quartile
- DFS completed for Gabanintha
- Offtake for 75% of average annual output
- Integration study underway for Yarrabubba to assess optimal mining & sequencing with Gabanintha

## **Part of the future energy solution**

- Potential for ore to be used in WA-made Vanadium Redox Flow Batteries (VRFBs)

## **Nationally significant project**



# CORPORATE OVERVIEW

## CAPITAL STRUCTURE

**TMT**

ASX Code

**\$22.0M**

Cash *(as at 13 Dec 2021)*

**\$63.1M**

Market Cap *(as at 13 December 2021)*

**203.7m**

Shares on Issue

**20.5M**

Unlisted Options<sup>1</sup> *(Various exercise)*

**3.65m**

Performance Rights<sup>2</sup>

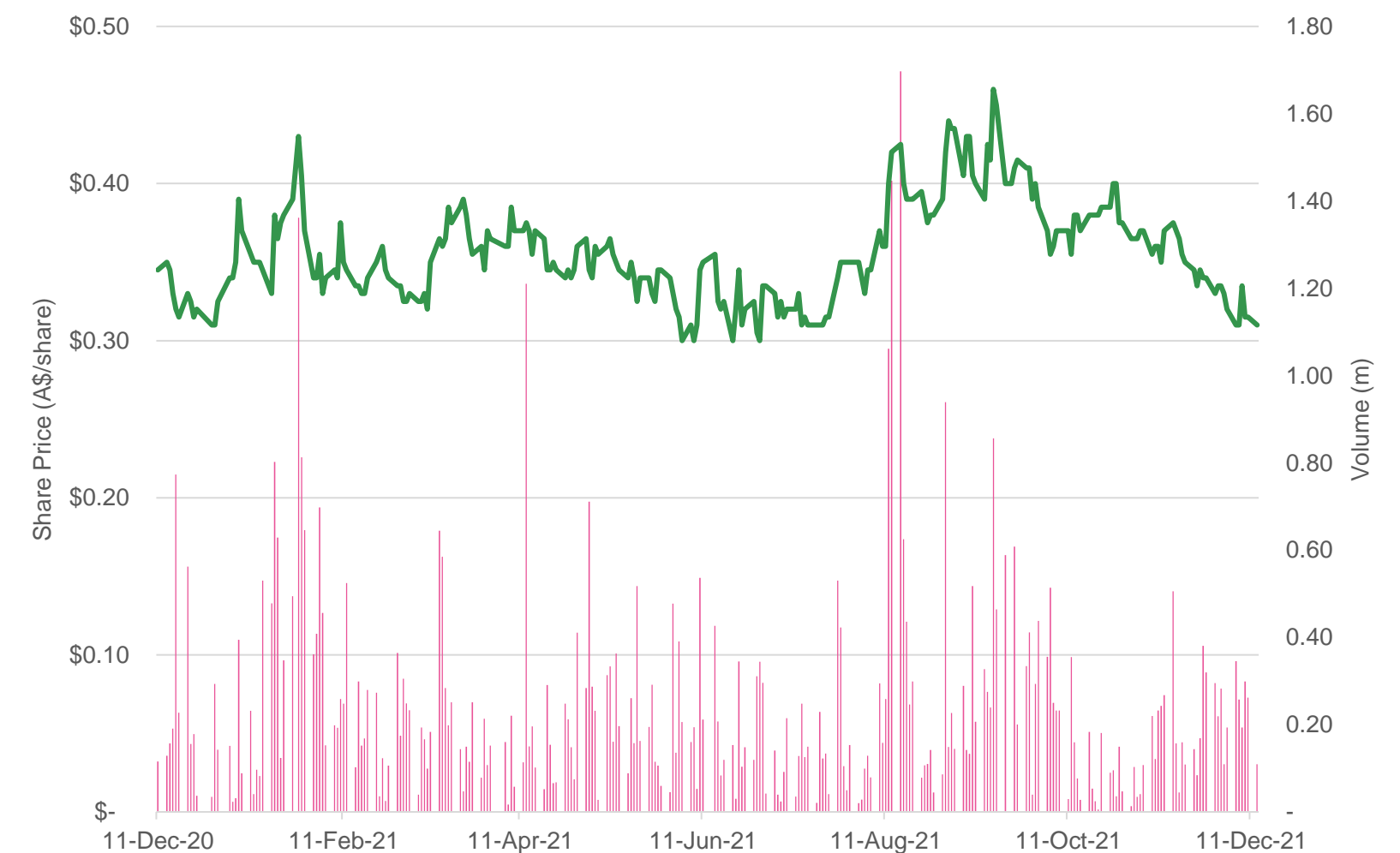
<sup>1</sup> Includes 14.35m director and employee options – 3.9m vested, balance vest on project development hurdles

<sup>2</sup> 50% vest on MTMP FID, 50% vest on first production



Holder Name	Holding (%)
Resource Capital Fund VII L.P.	17.7%
BNP Paribas Nominees	7.9%
Great Southern Flour Mills	6.9%
Retzos Group	4.8%
<b>TOTAL TOP 20</b>	<b>55.8%</b>
Board and Management holdings (fully diluted)	7.9%

\*Based on issued capital as at 13 December 2021



# EXPERIENCED BOARD AND MANAGEMENT



**Michael Fry**  
Non-Exec Chairman

Michael holds a Bachelor of Commerce degree from the University of Western Australia, is a Fellow of the Financial Services Institute of Australasia, and is a past member of the Australian Stock Exchange. Mr Fry has extensive corporate and commercial experience, financial and capital market knowledge and a background in corporate treasury management.



**Ian Prentice**  
Managing Director

Ian holds a Bachelor of Science (Geology) from the University of Western Australia and has over 30 years experience in the global mining industry, spanning exploration, development and open cut and underground mining. Ian is a Member of the Australasian Institute of Mining and Metallurgy.



**Sonu Cheema**  
Non-Exec Dir/Co Sec

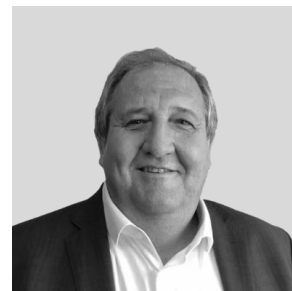
Sonu is a Partner at Cicero Group with over 10 years' experience working with public and private companies in Australia and abroad. Roles and responsibilities held by Mr Cheema include completion and preparation of management and ASX financial reports, investor relations, initial public offers, mergers and acquisitions, management of capital raising activities and auditor liaison.



**Jacqueline Murray**  
Non-Exec Director

Jacqueline is a Partner at Resource Capital Funds (RCF) and has worked within the mining industry for over 20 years.

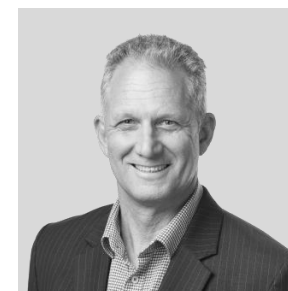
Mrs Murray joined RCF in 2012 after working in business analysis and improvement roles with BHP Billiton. Prior to this she worked in various geotechnical engineering roles in underground and open pit operations within BHP Billiton and WMC Resources.



**Dave English**  
Chief Operating Officer

David is a mining professional with over 30 years operations and project development experience working in the Western Australian resources industry.

Mr English was General Manager Operations at the Windimurra Vanadium Project from February 2008 until February 2010 involved in the process of re-developing the project.



**Michael Bourke**  
Project Director

Michael holds a Master of Business Administration, Bachelor Economics and Bachelor Engineering (Chemical) degrees and worked in the minerals and metals industry for over 30 years.

His commodity experience covers mineral sands, nickel, cobalt, vanadium, tin, LNG and oil sands.



**John McDougall**  
Exploration Director

John holds a Bachelor of Science with Honours (Geology) from the University of Tasmania and has over 20 years experience in mineral exploration, with iron ore, base and precious metals experience.

John has been managing the geological data acquisition at Gabanintha and Yarrabubba since February 2017.

# ENVIRONMENT, SOCIAL & GOVERNANCE

BUILDING A GLOBALLY RELEVANT RESOURCES COMPANY



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## Environment

Constructive consultation with WA EPA supporting progress on the GVP ERD.

Early engagement with Traditional Owners and Pastoralists to minimise impacts.

Promote energy efficiency and minimise water usage.

Policy of mitigation, minimisation and rehabilitation.



## Social / Community

Policy in place to support local procurement and employment wherever practical.

Support community events and activities – developing a social licence to operate.

Generate training, business and work opportunities for Traditional Owners.

Pursue downstream processing options to ensure value add and skills development.



## Governance

Instilling a culture of high ethical standards throughout the group and its activities.

Aim to always operate in a safe and respectful manner.

Focus on active risk management throughout the business.

Develop, nurture and maintain our people.

# STRATEGIC PLAN

To produce strategic technology metals that reduce emissions and produce emissions free power

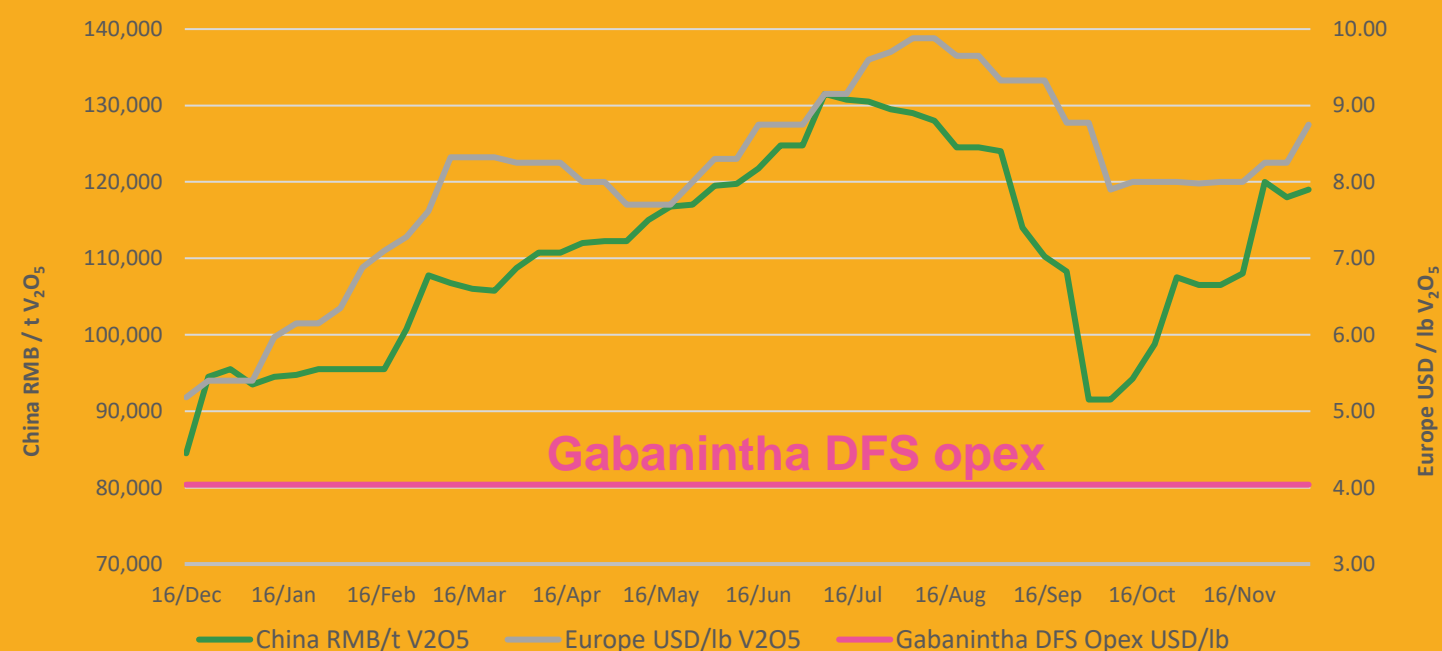


# VANADIUM

## A CRITICAL MINERAL SUPPORTING NET ZERO

- Vanadium has an important role to play strengthening steel, enabling higher quality steel, lowering emissions.
- It is also used in very large-scale batteries (VRFB) that don't degrade over time, ideal for support of renewable energy.
- Tightening market with consumption in steel in China and improving demand in Europe and North America – 5,450 MT V deficit in first half 2021.
- COVID-19 impacts – stimulus spending on infrastructure and focus on renewable energy / storage.

**V<sub>2</sub>O<sub>5</sub> Vanadium Pentoxide Flake 98% Price USD / lb**



55% operating margin based on recent pricing

In 2019, the CO<sub>2</sub> savings from including vanadium in rebar represented 1.5% of the total CO<sub>2</sub> emissions from industrial processes in China.

Santos et al, Texas A&M University

# VANDIUM REDOX FLOW BATTERIES

ENABLING THE FUTURE OF GREEN ENERGY



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## No Degradation

Performance remains constant with excellent long term charge retention



## Low Energy Cost

Over its 20+ year lifespan, VRFB technology offers the lowest cost per kWh stored (LCOE)



## Safety

The vanadium electrolyte is water based and is totally non-flammable



## Sustainability

The vanadium is fully reusable and recyclable at end of the battery life





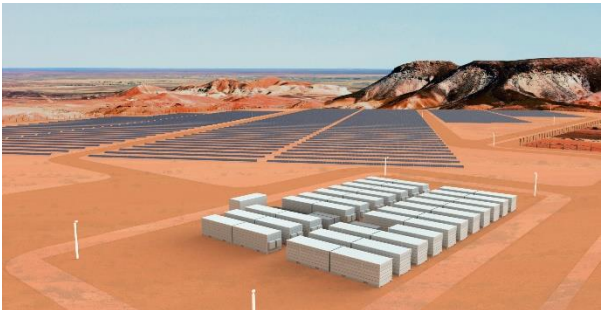



## Long Life

VRFB's can easily last more than 20 years with very high cycle life (up to 20,000 cycles)

Argus: China's vanadium demand from the VRFB industry expected to rise from 3,640tpa in 2021 to 9,100tpa in 2022

# VRFB DEPLOYMENTS

Superior technical and economic fundamentals are leading to massive deployment of VRFBs, especially in Asia - large scale VRFB projects being delivered in Japan and China.

Details	Sumitomo	Rongke Power	VRB Energy	Shanghai Electric	Yadlamalka Energy
Image			n/a	n/a	
Project Location	Hokkaido, Japan	Dalian City, China	Hubei province, China	Jiangsu province, China	South Australia
Stage	Commenced operations in 2015	Operational	Construction	Public plans	Construction
Developer					
Scale	60MWh (15MW for 4h)	800MWh (200MW)	500MWh (100MW)	400MWh (100MW)	8MWh (2MW)
Application	Stabilise the flow of wind and solar power on the northern island of Hokkaido	Project will provide peak-shaving as well as form another load center for the Dalian peninsula, enhancing grid stabilisation	Energy storage solution paired with wind power and solar PV generation	n/a	The project will supply a combination of solar power and battery storage services to the grid

Source: Company announcements.

# VRFB AND ELECTROLYTE STRATEGY

## PART OF THE ENERGY SOLUTION



- MoU signed with LE System to investigate the production of vanadium electrolyte in Australia using Technology Metals' high purity vanadium products.
- Vanadium electrolyte business plan:
  - Production centres contemplated on western and eastern seabords of Australia.
  - Competitive advantage as a very low cost high purity vanadium producer.
  - Long term – stable supplier to provide certainty for VRFB developers.
  - Significant political support for decarbonization opportunities.
- Discussions initiated with VRFB manufacturers with regards to the establishment of Australian VRFB deployment.
- The evolution of the MTMP from a high purity  $V_2O_5$  flake producer into downstream applications forms part of the sustainability strategy.



**LE SYSTEM CO., Ltd.**

LE SYSTEM Co., Ltd.

# MURCHISON TECHNOLOGY METALS PROJECT

Integration study underway into open pit mining, beneficiation and high purity vanadium processing facility in the mid-west of Western Australia.

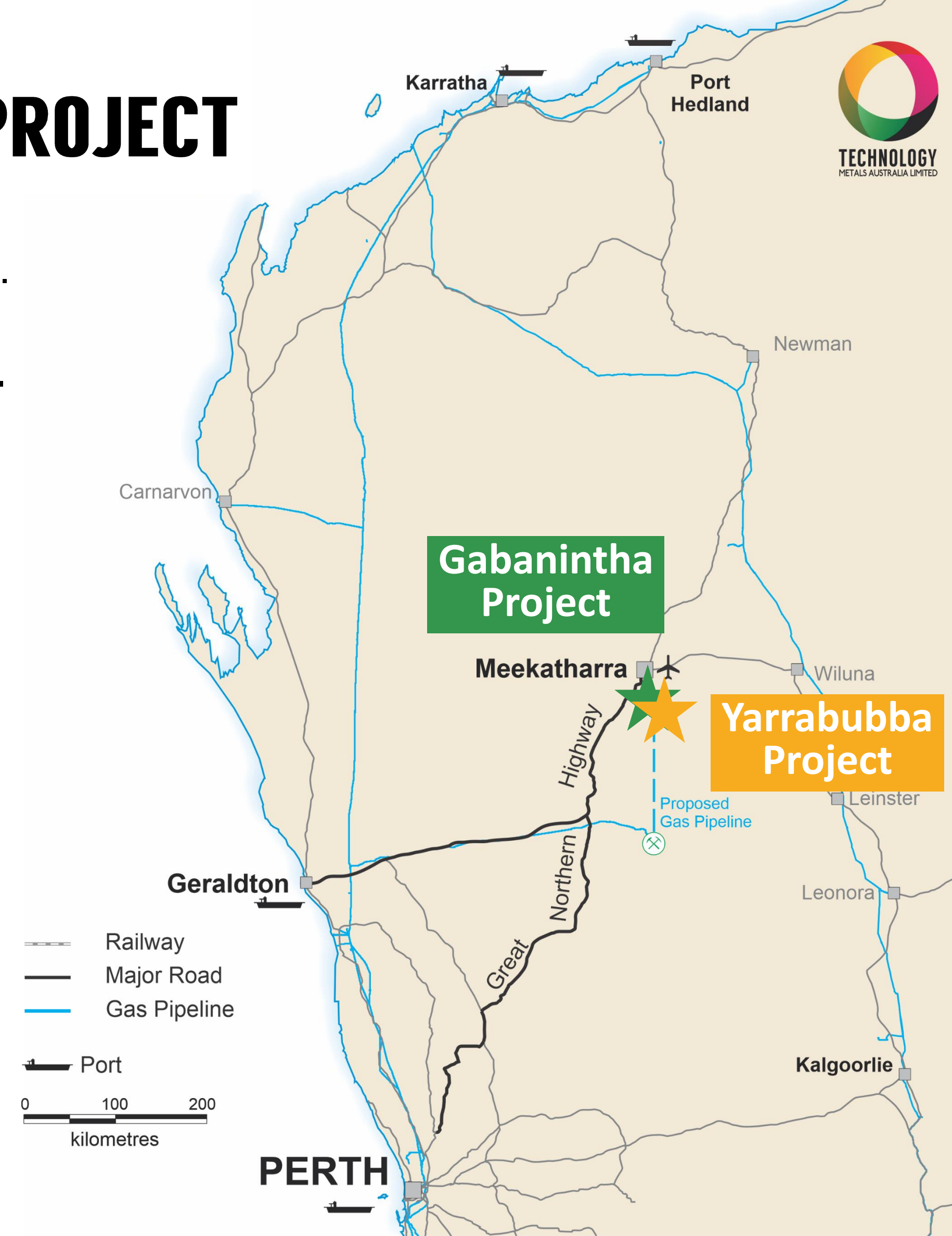
**High-quality, high-grade resource of 79.8Mt at 1.1%  $V_2O_5$   
50.2Mt at 0.9%  $V_2O_5$  M&I component to target a +25 year operation.**

## GABANINTHA VANADIUM PROJECT

- DFS completed
- Large, long-life high purity VTM hosted vanadium project
- Lowest cost quartile
- Offtake for 75% of average annual output

## YARRABUBBA VANADIUM DEPOSIT

- High grade  $>1.6\%$   $V_2O_5$  in magnetite concentrate
- Same geological setting as Gabanintha
- Metallurgical testwork progressing
- Ability to produce high quality titanium by-product



# GABANINTHA VANADIUM

## WORLD-CLASS DEVELOPMENT READY PROJECT

### MINING RESERVE

**29.6Mt**  
@ 0.88% V<sub>2</sub>O<sub>5</sub>

### MINE LIFE

**+16years**

### PROCESSING PLANT

**27.9Mlb**  
V<sub>2</sub>O<sub>5</sub> pa

### HIGH PURITY PRODUCT

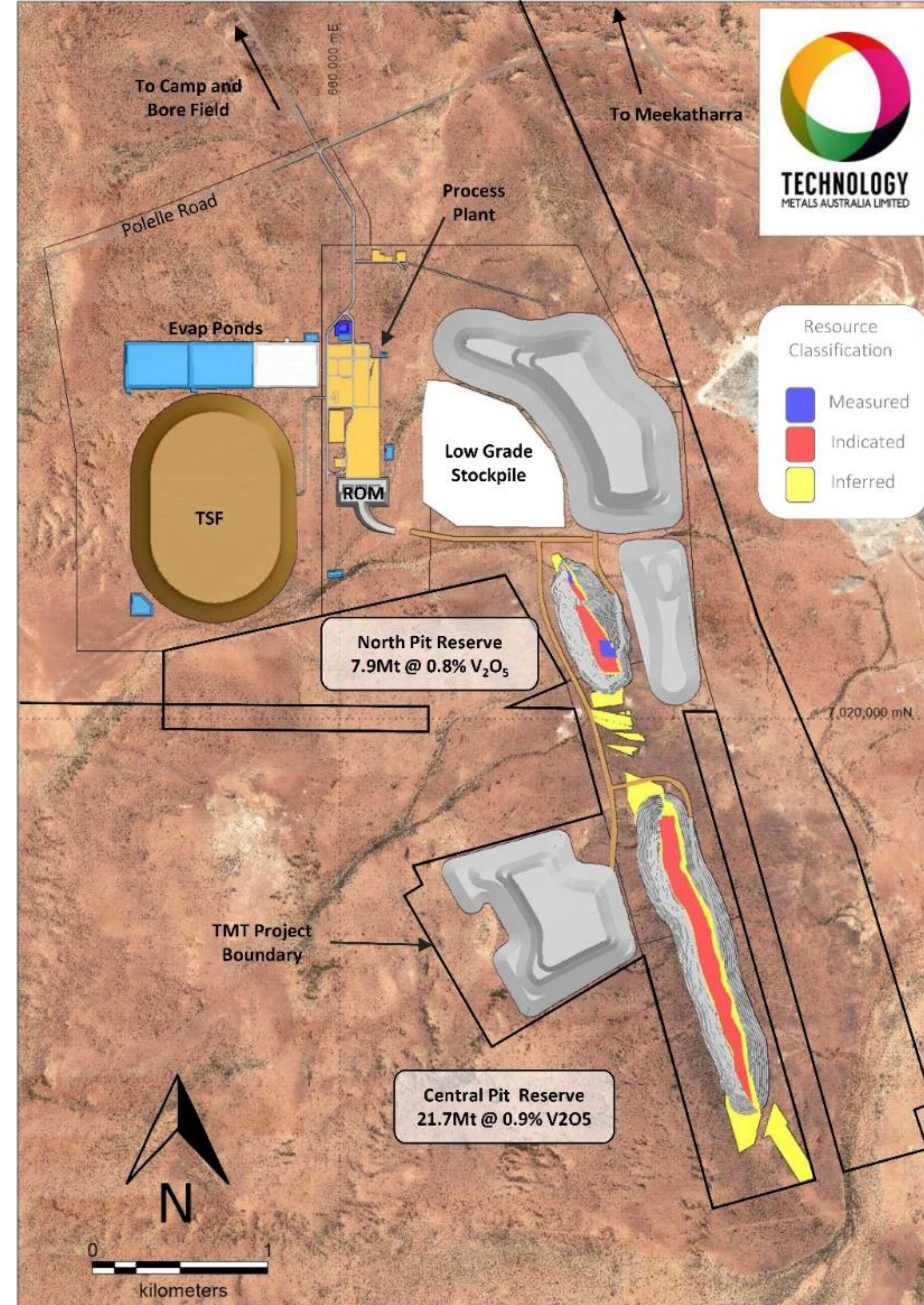
**>99% V<sub>2</sub>O<sub>5</sub>**

### OPEX

**US\$4.04**  
/ lb V<sub>2</sub>O<sub>5</sub>

- One of the worlds highest grade deposits – resource of 109.5Mt at 0.8% V<sub>2</sub>O<sub>5</sub> - high grade zone of 60.7Mt at 1.1% V<sub>2</sub>O<sub>5</sub>.
- Ore body characterised by **shallow oxidation** profile.
- Life of mine<sup>1</sup> **revenue of A\$5.7Bn** at US\$8.78/lb V<sub>2</sub>O<sub>5</sub> with average annual EBITDA of A\$175 million.
- Lowest cost quartile **operating costs at US\$4.04/lb** V<sub>2</sub>O<sub>5</sub>.
- Pre-tax **NPV<sub>8</sub> A\$663** at US\$8.78/lb V<sub>2</sub>O<sub>5</sub>.
- Premium purity product (>99%) supporting the movement to Net Zero 2050.
- Site of integrated processing facility for consolidated Murchison Technology Metals Project (MTMP).
- Mining licences granted, environmental approvals nearing completion.
- Gas supply MoU in place

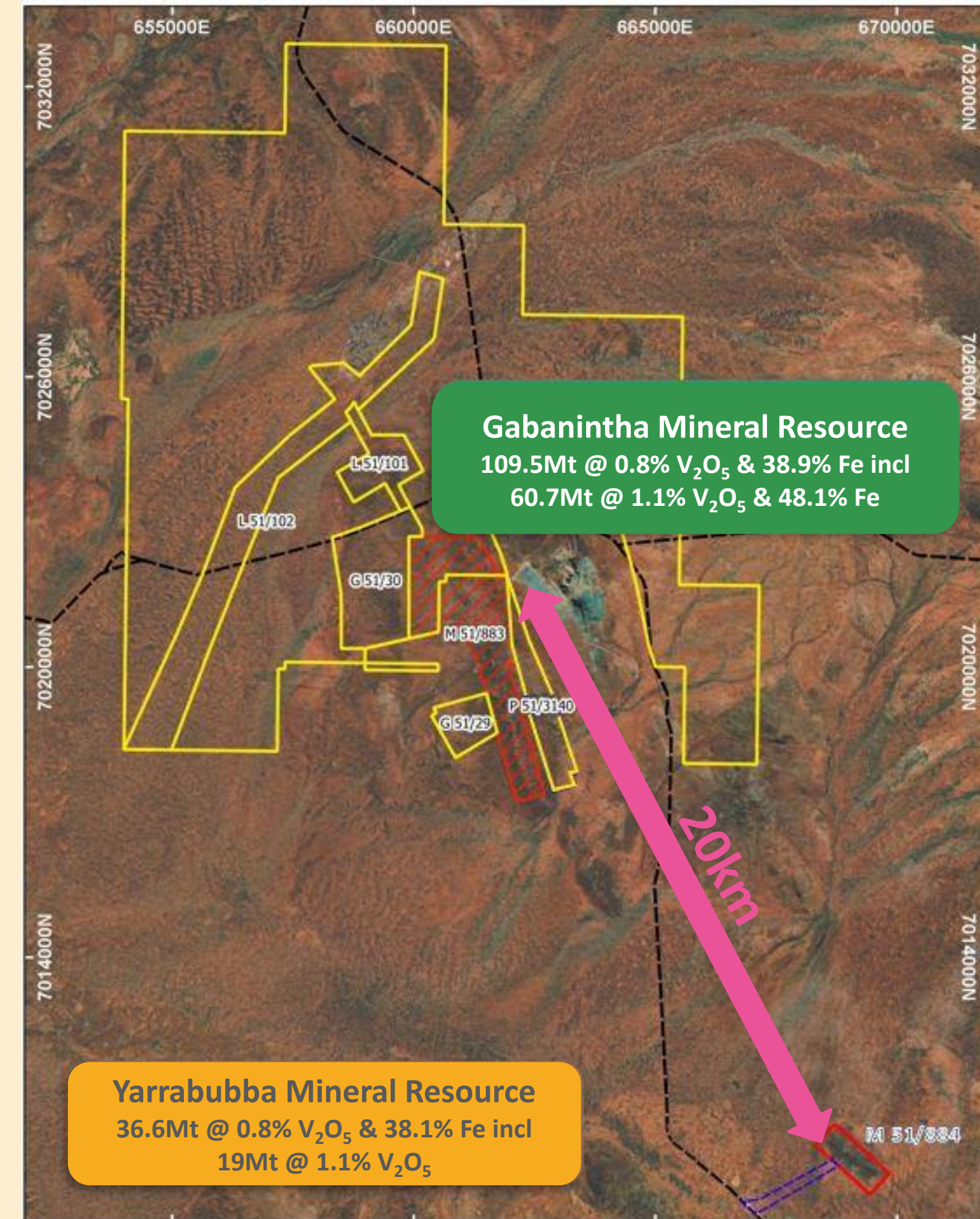
1 - TMT ASX announcement 21 August 2019 for full details of the DFS: Financial Metrics at long term historical average price of US\$8.78/lb V<sub>2</sub>O<sub>5</sub>



# YARRABUBBA VANADIUM

## OVERVIEW

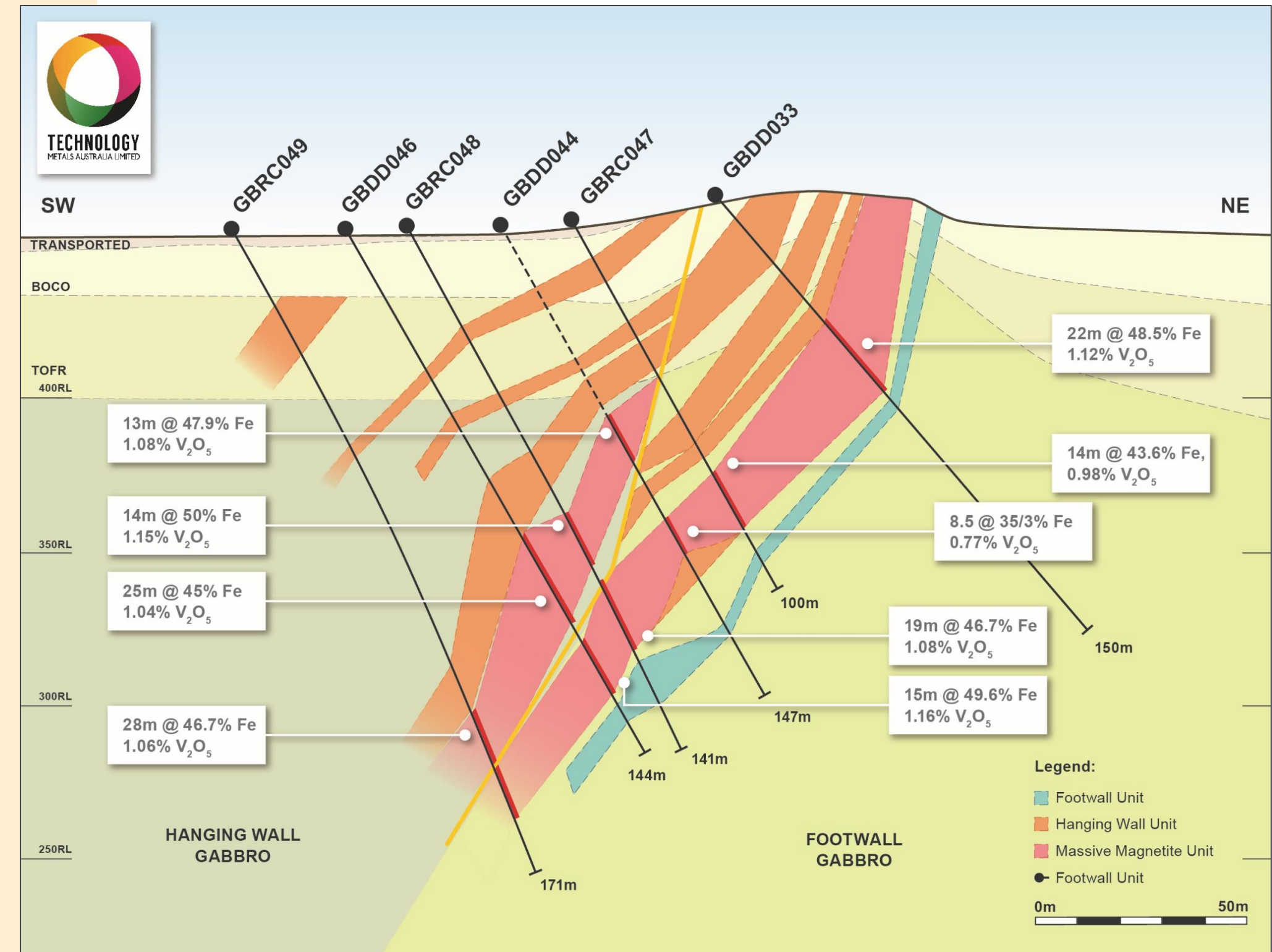
- Yarrabubba, located 20km to the south of Gabanintha, was not considered in the Gabanintha DFS.
- Yarrabubba has the potential to materially increase the mine life of the Murchison Technology Metals Project.
- Mineralisation hosted in same geological horizon as Gabanintha but produces higher grade  $V_2O_5$  concentrate.
- Mineral Resource upgraded to 36.6Mt at 0.8%  $V_2O_5$**  including a high-grade component of 19Mt at 1.1%  $V_2O_5$ <sup>1</sup>.
- Indicated Resource increased by 110%** to 20.2Mt at 0.9%  $V_2O_5$  within the MTMP Global Measured and Indicated Resource of **50.2Mt at 0.9%  $V_2O_5$** <sup>1</sup>.
- Beneficiation testwork delivers **1.6 to 1.7%  $V_2O_5$  in concentrate**; ~25% higher than at Gabanintha.
- An Integration Study is underway to assess the optimal mining and sequencing of Gabanintha and Yarrabubba.



# YARRABUBBA PROJECT

## INTEGRATION STUDY UNDERWAY

- Study will deliver optimised production, operating costs and capital costs, with completion expected in mid-2022.
- Sighter roast – leach testwork confirmed concentrate amenable to high recovery extraction<sup>1</sup>.
- 120kg of magnetic concentrate on site at FLSmidth's kiln testing facility for larger scale roast – leach testwork.
- Infill diamond drilling to commence in January 2022 to collect bulk sample for vendor / customer product generation.
- Open pit mine scheduling underway to optimise the integration of Yarrabubba ore into the MTMP and deliver an updated Ore Reserve estimate.
- Key differentiators for Yarrabubba
  - Very shallow oxidation with high magnetic recovery.
  - **Titanium** by-product (+48%  $\text{TiO}_2$ ) from non magnetics.
  - Simple open pit mining.
  - Thickened high-grade magnetite zones near surface.



# MURCHISON TECHNOLOGY METALS PROJECT

## KEY PROJECT PARTNERS



### WA Government

Lead Agency Support  
Future Battery Industry  
Supporting downstream processing.

### NAIF

Engagement with Federal Government agency  
Part of strategic funding approach.

### WA EPA

Environmental approvals  
Constructive consultation underway

### APA

Gas transportation agreement  
Lower gas transportation costs; access to emerging Perth Basin gas fields.

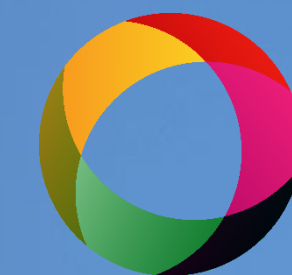
### FLSmidth

Equipment vendor engagement  
Kiln supply agreement executed.

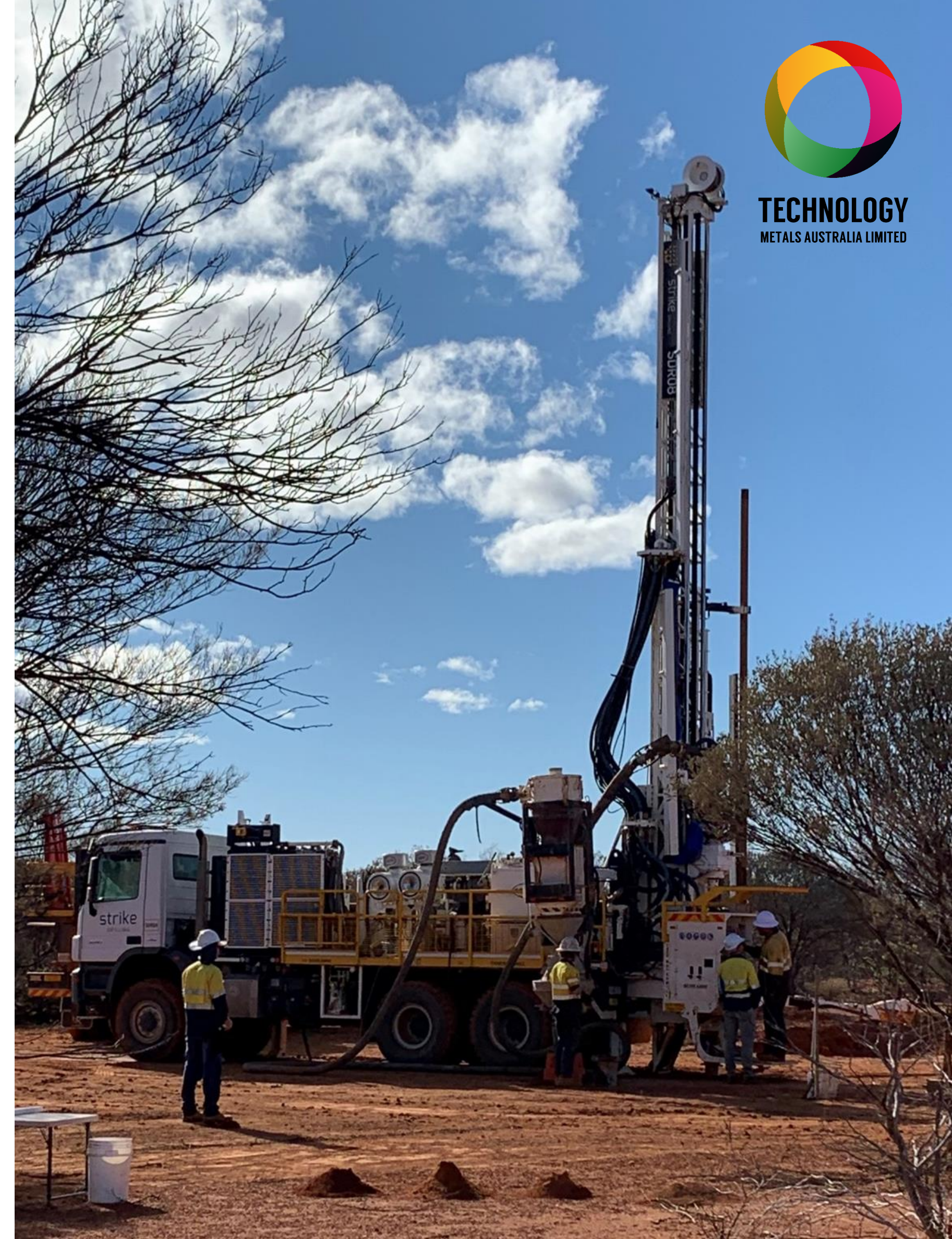
Ongoing market engagement for product offtake / funding options  
CNMNC, Shaanxi Fengyuan, Big Power, LE System.

# TIMETABLE AND NEWS

Mining leases - granted	✓	
Bulk sample generation	✓	
Infill Resource drilling	✓	
Mineral Resource update	✓	
Roast / leach testwork		Q4 21 / Q1 22
Ore Reserve update		H1 2022
Process plant design optimisation		H1 2022
Environmental approvals		H1 2022
Integration Study completion		Q2 / Q3 2022
Project development decision		H2 2022



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# A COMPELLING INVESTMENT



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## Globally Significant

project with robust economics located  
in a Tier 1 jurisdiction

## Strategic Investor

RCF VII with long-term focus on supporting  
project development

## Critical Metals

to deliver critical minerals that support  
emissions reduction goals

## Delivering

on project development underpinned by high  
quality technical work

## Team in place

focused on a development strategy to  
maximise shareholder value

## Stable

operating environment with excellent  
infrastructure and access



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## CONTACT US

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