



**TECHNOLOGY**  
METALS AUSTRALIA LIMITED

# **DEVELOPING THE WORLD'S NEXT PRIMARY VANADIUM MINE**

**StockPal's Mines Unearthed Webinar**

**31 March 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 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.*

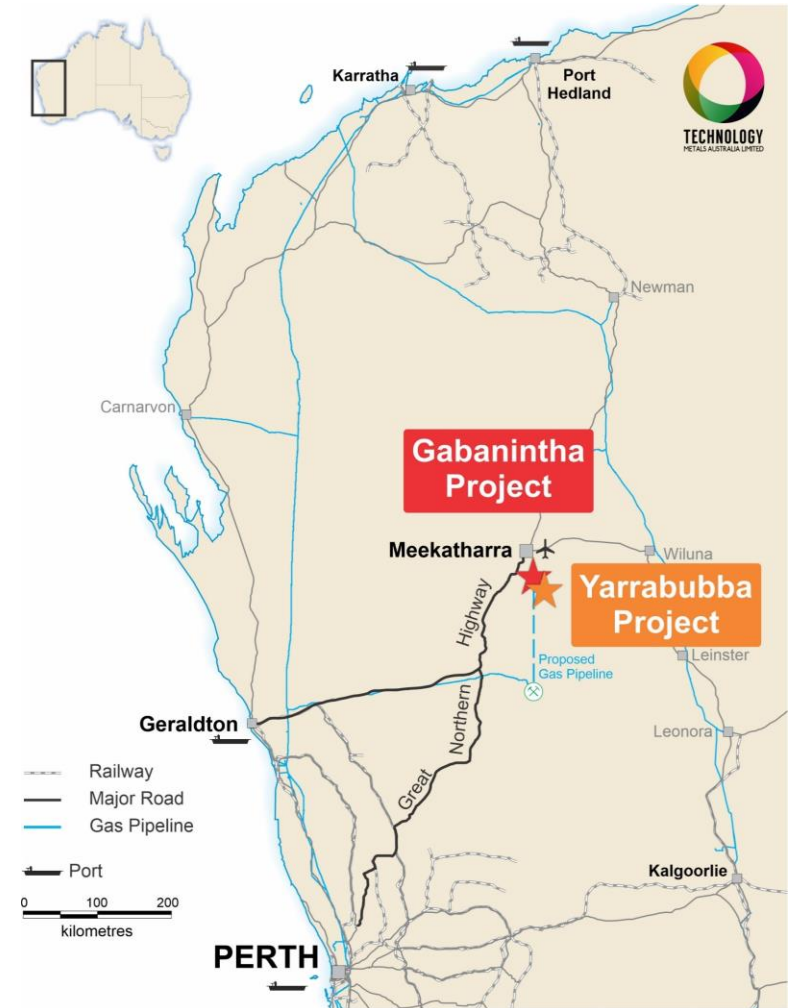
All currency amounts are in AUD\$ unless stated otherwise.



# TMT Vision: To be High Purity Vanadium Producer of Choice

## Vanadium – The Green Metal – Set to be a Key Contributor to the Decarbonization of the Globe

- **Gabanintha Vanadium Project** – a large scale, long life, low cost, high purity vanadium development project.
  - DFS completed – offtake and financing discussions progressing.
  - Regionally and nationally significant development project – critical mineral, community / Government support.
- **Downstream processing** strategy to develop vanadium electrolyte production capability in Western Australia.
  - Scope to develop a domestic VRFB business under investigation.
  - Vanadium's strategic importance recognised with inclusion in the Federal Governments Modern Manufacturing Initiative, supporting downstream processing and manufacturing
- **Staged Development Opportunity** with the emergence of the Yarrabubba Iron-Vanadium Project – minimise initial capital expenditure, maximise benefits for shareholders.



# Corporate Overview

**TMT**

ASX Code

**\$51.8m**

Market Cap

(as at 30 March 2021)

**15.2m**

Unlisted Options<sup>1</sup>

(various exercise)

**\$9.5m**

Cash

(as at 31 December 2020)

**150.1m**

Shares on Issue

**2.65m**

Performance Rights<sup>2</sup>

<sup>1</sup> Includes 8.85m director and employee options – 3.9m vested, 4.1m to vest on GVP FID, 0.85m vest on YIVP hurdles

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

CAPITAL STRUCTURE

| Holder Name                | Holding (%) |
|----------------------------|-------------|
| 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%        |
| <b>TOTAL TOP 20</b>        | <b>47.8</b> |

# 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 – ~8% fully diluted





# Major Use is in Steel – Batteries Rapidly Emerging



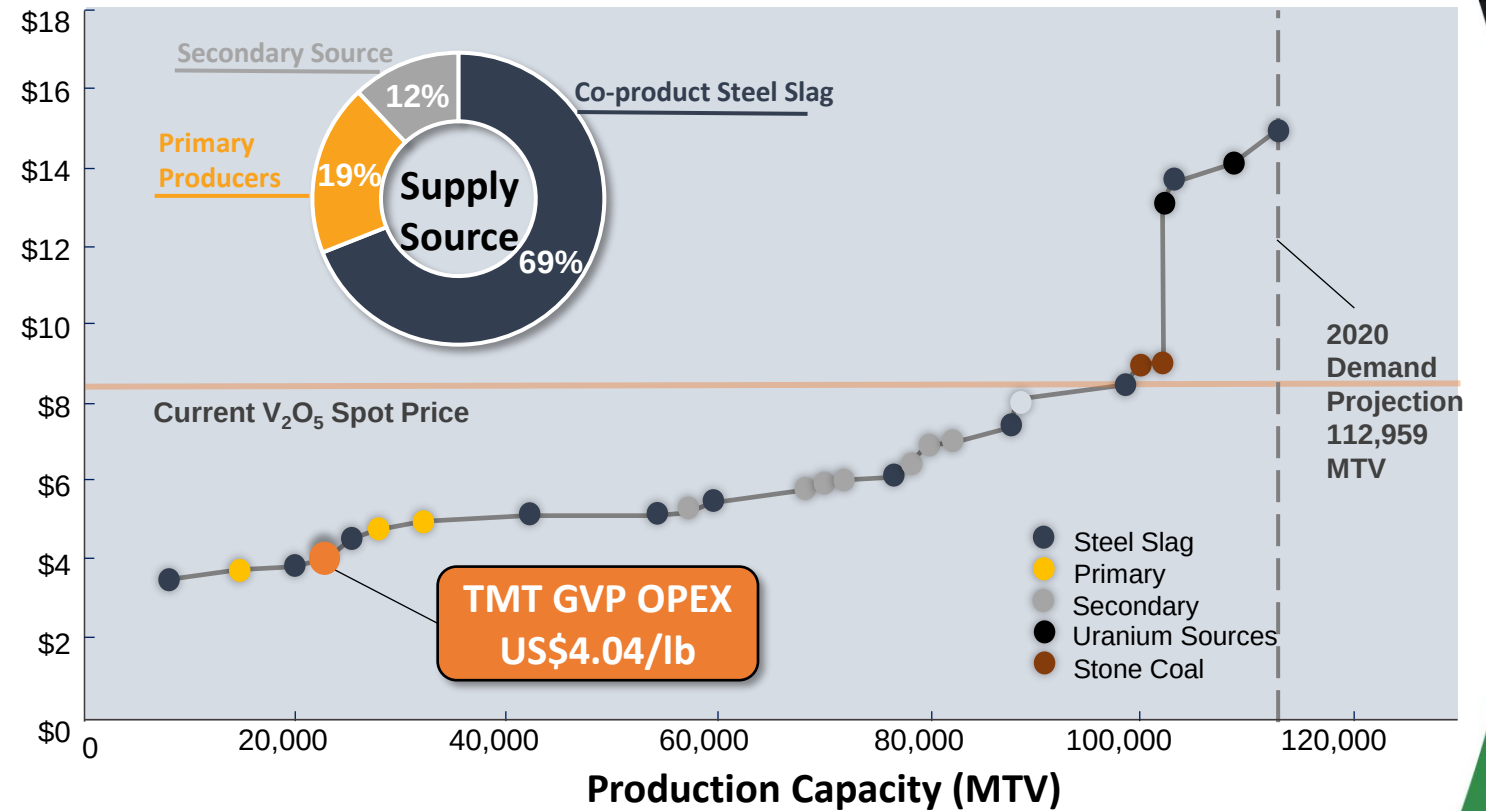


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# Vanadium Market Dynamics

- China net importer of vanadium in late 2019 – first time in 10 years.
- 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



# GABANINTHA VANADIUM PROJECT

One of the Highest Grade Undeveloped Vanadium Deposits in the World



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**NORTHERN BLOCK  
RESOURCE**  
**109.5Mt**  
@ 0.8%  $V_2O_5$

**MINING  
RESERVE**  
**29.6Mt**  
@ 0.88%  $V_2O_5$

**PROCESSING  
PLANT**  
SALT  
ROAST  
WATER  
LEACH  
**27.9Mlb**  
 $V_2O_5$  pa

**HIGH PURITY  
PRODUCT**  
**>99%  $V_2O_5$**

**OPEX**  
**US\$4.04**  
/ lb  $V_2O_5$

**MINE LIFE**  
**+16years**

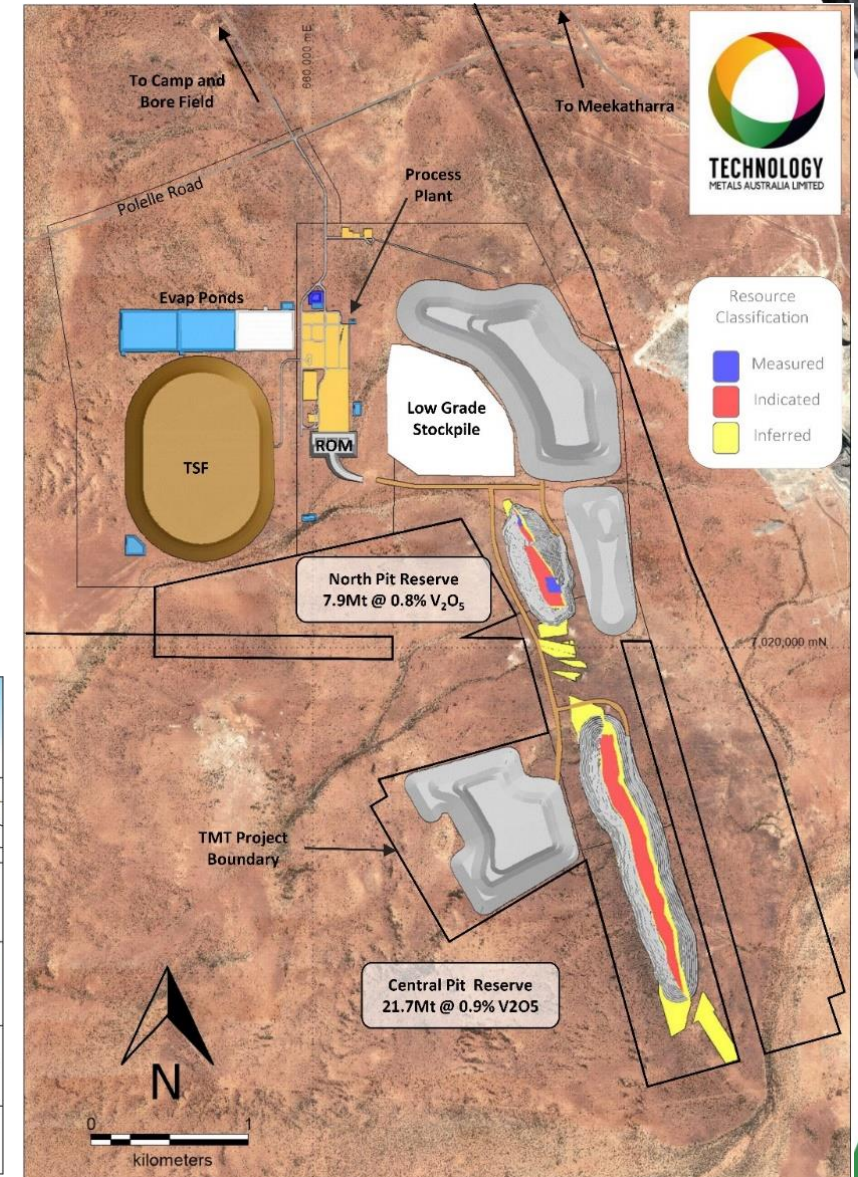
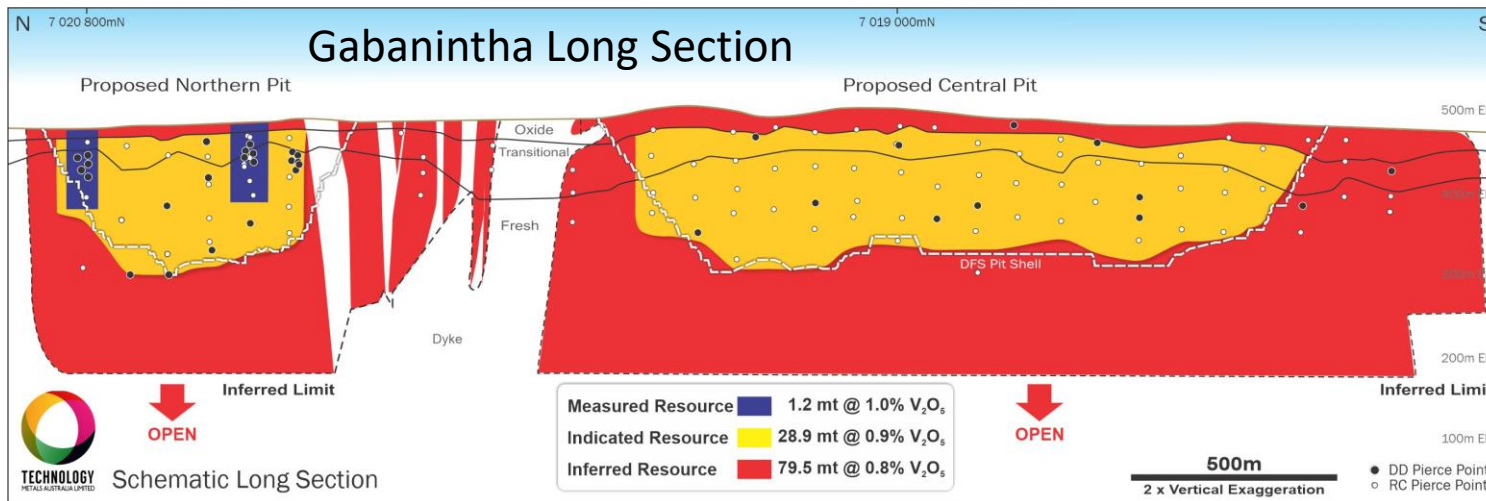




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# World Class Resource – Simple Open Pit Mining

- 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%  $V_2O_5$  within total mineral resource of 109.5Mt at 0.8%  $V_2O_5$ .
- 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.





# 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.

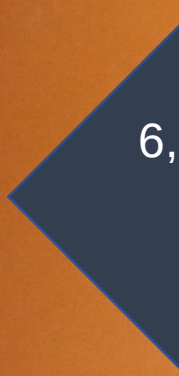


## **Shaanxi Fengyuan offtake MOU over 3,000Tpa.**

- Take-or-pay ~24% of annual production.
- Five-year term with five-year extension.

## **Big Paver offtake MOU over 1,000Tpa take-or-pay and up to 5,000 Tpa**

## **LE System technical collaboration and downstream electrolyte production MOU.**



6,000 to 10,000 tonnes of TMT's proposed production of 12,800Tpa  $V_2O_5$  covered under Binding Offtake and MoU





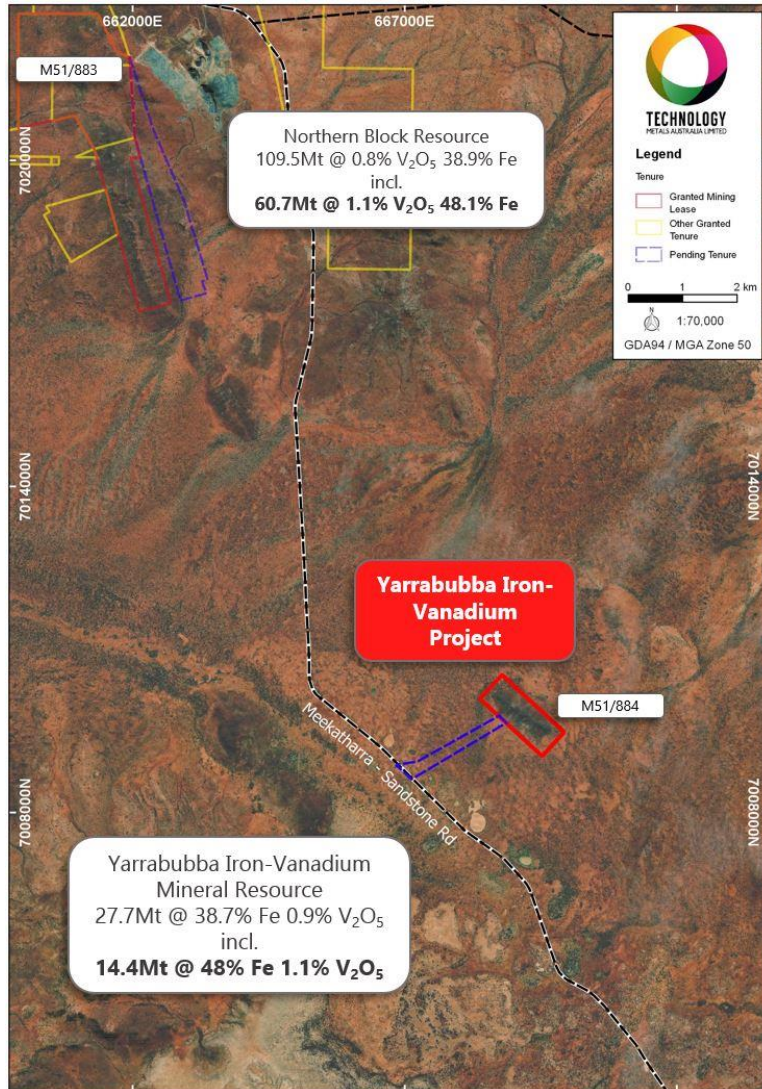
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# **THE EMERGING OPPORTUNITY YARRABUBBA IRON-VANADIUM PROJECT**

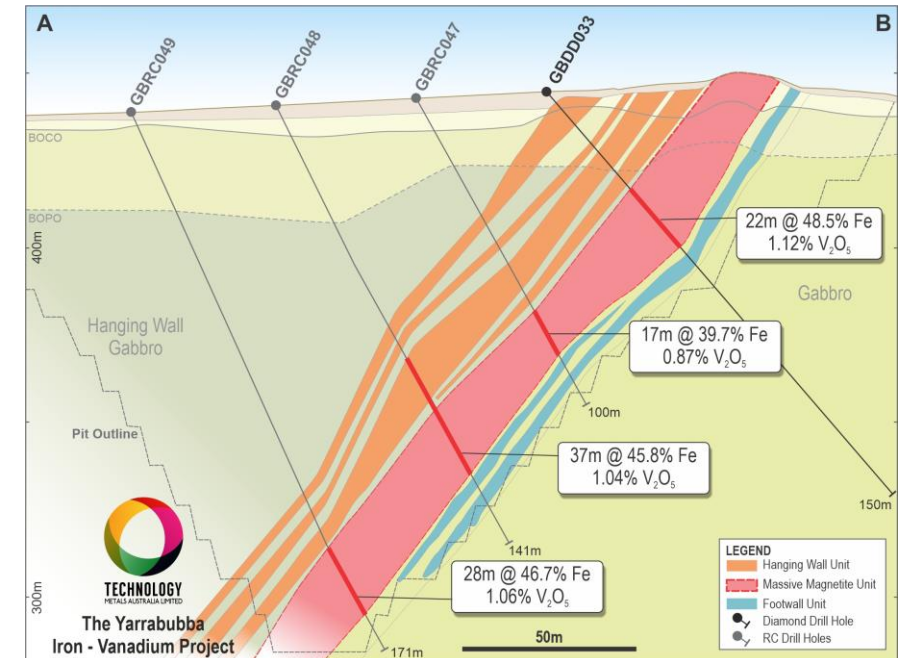


# Yarrabubba – Unlocking the Value

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- Staged development strategy complementary to Gabanintha Vanadium Project.
- CMB circuit to be built at Gabanintha – benefitting the long term Project development.
- Key differentiators:
  - ✓ High in-situ iron grades
  - ✓ Very high mass recoveries
  - ✓ Simple open pit mining
  - ✓ Low risk processing
  - ✓ High quality product

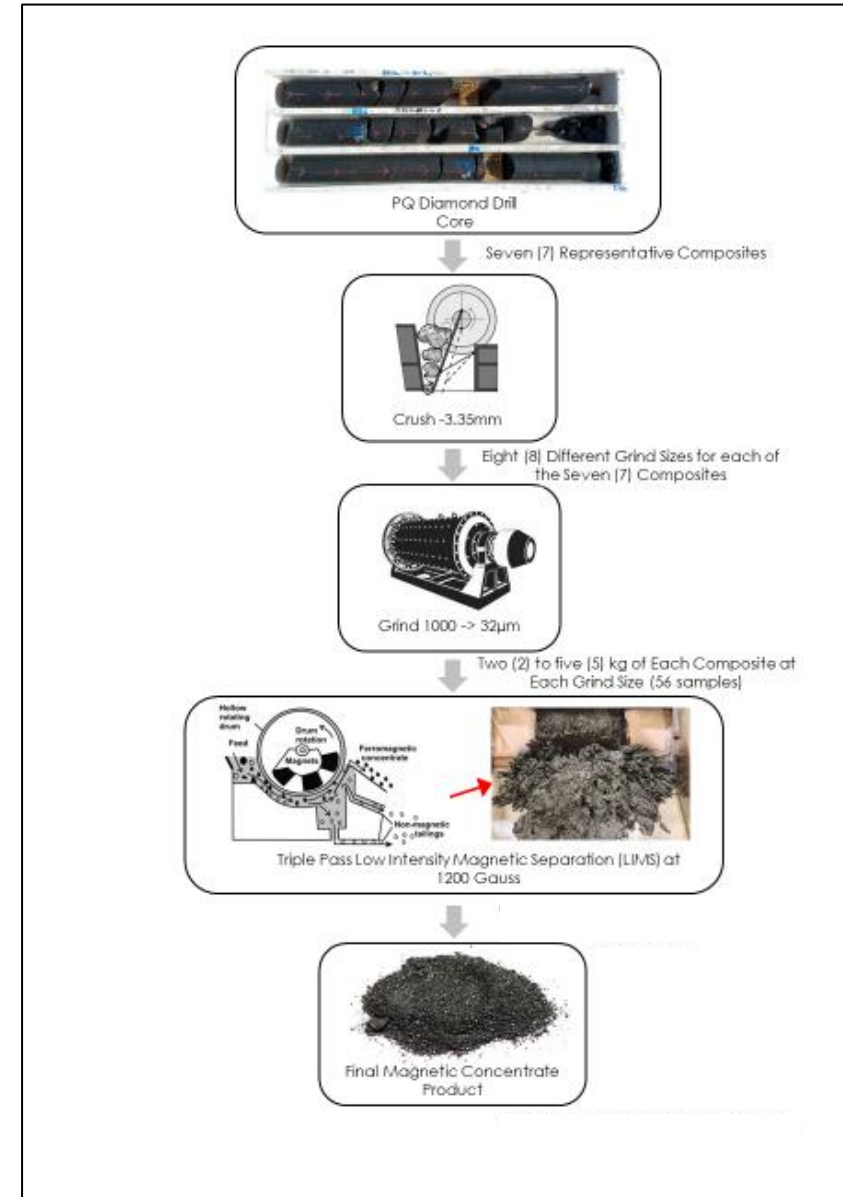




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# Premium Iron-Vanadium Magnetic Concentrate

- LIMS testwork confirms high grade, high purity iron-vanadium magnetic concentrate.
- Weighted average grade of **62.8% Fe** and **1.66%  $V_2O_5$**  at a 75-micron grind size with mass recovery of 49.6%.
- Low levels of deleterious elements at weighted average 0.62%  $SiO_2$ , 0.96%  $Al_2O_3$ , 0.017% S and 0.001% P.
- **Expected to generate premium product** with associated premium pricing.
- Sighter testwork on non-magnetic tails demonstrated scope to produce valuable titanium (ilmenite) bearing by-product.
- High titanium recovery using standard gravity separation processing; larger scale testwork nearing completion.





# 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).

*“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*



# Yarrabubba Development Activities

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Premium Iron-Vanadium  
Product Confirmed

Flowsheet  
Definition

Pilot Scale  
Testwork

Engineering -  
Process Design

Bulk Product  
Generation

Feasibility Study  
Completion

**Development  
Decision**



## ■ Workstreams in support of project development :

- Diamond drilling to generate bulk sample, geotechnical data and resource infill – **done**;
- Environmental Review Document for Gabanintha development envelope – **draft submitted**;
- Evaluation of logistics options, haulage routes, port access - **progressing**;
- Definition of the process flowsheet – **progressing in line with testwork**;
- Resource infill and extension RC drilling – scheduled for April/May 2021;
- Pilot scale testwork to up-scale flowsheet, customer samples – scheduled for June/August 2021;
- Preparation of Yarrabubba environmental submissions to progress Mining Approvals.

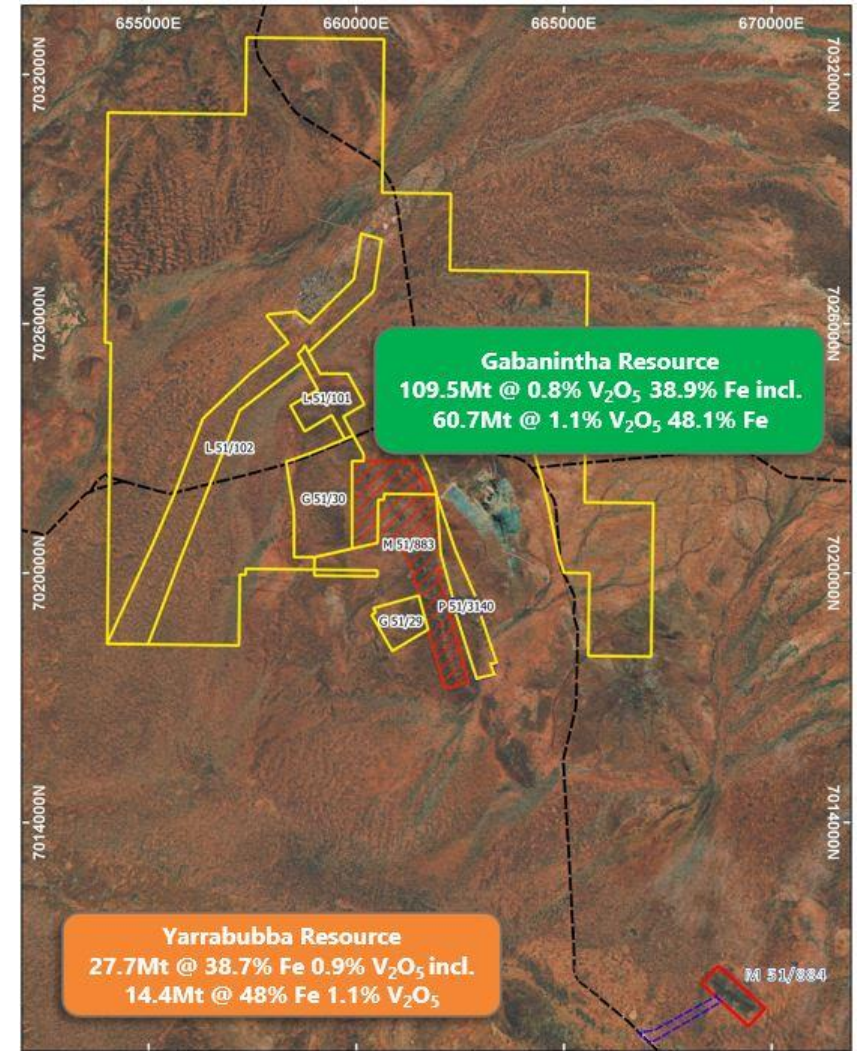


# Project Development Partners

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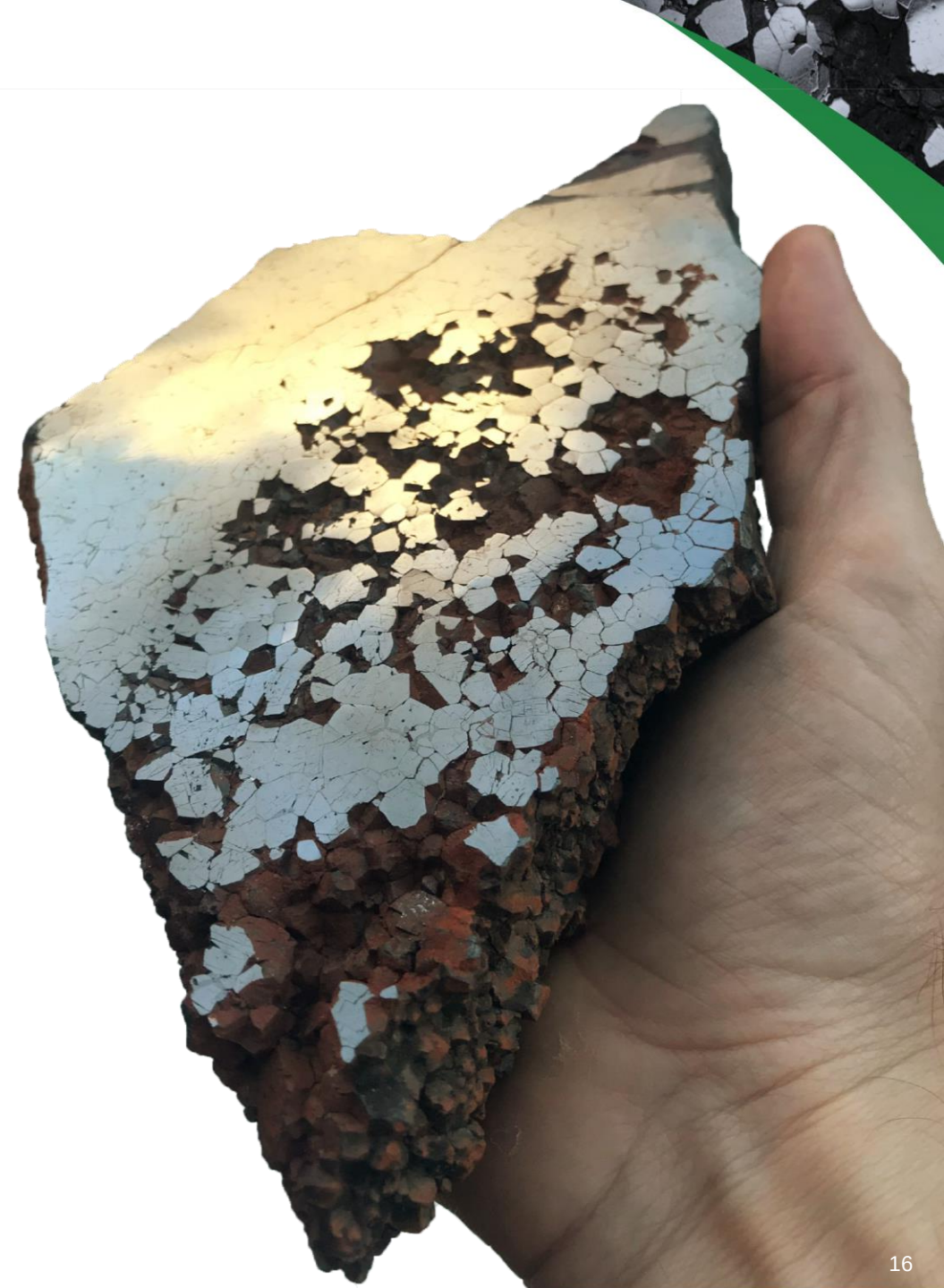


- Western Australian Government Lead Agency Support - Future Battery Industry strategy supporting downstream processing options.
- NAIF engagement – part of strategic funding approach.
- Gabanintha environmental approvals - ERD lodged Q1 CY 2021.
- Gas transportation agreement with APA – reduces gas 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 and funding options.



# Investment Case

- ✓ **Leveraged** to the rapidly emerging stationary storage / renewables market and trend towards decarbonization.
- ✓ **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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VALUE FOR SHAREHOLDERS**



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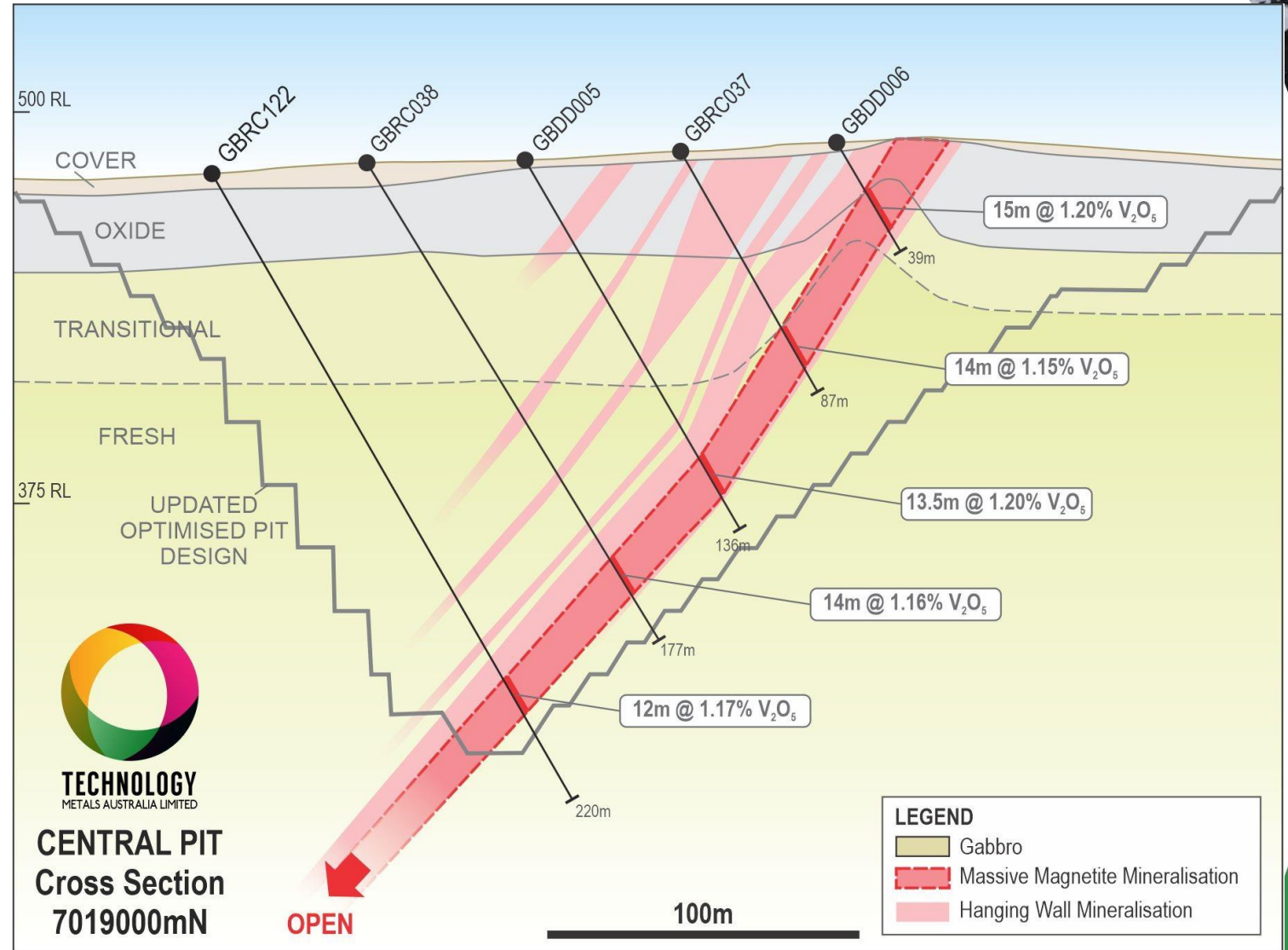
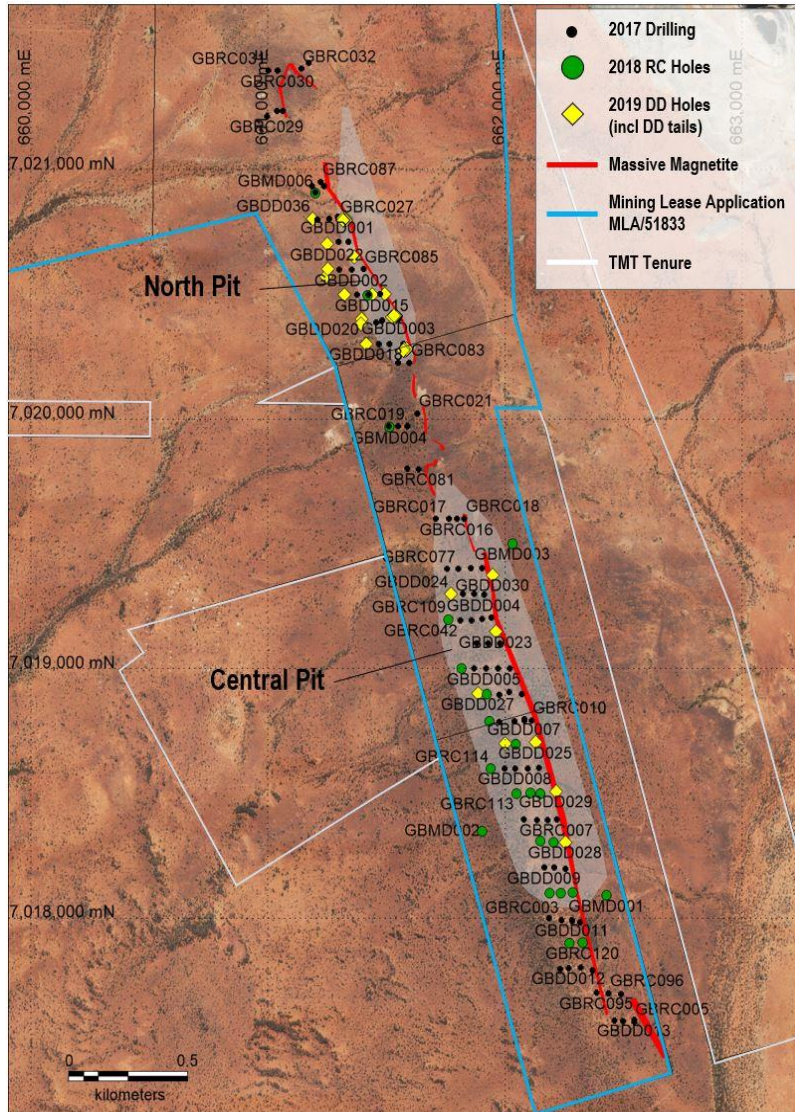


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# APPENDICES



# Shallow Oxidation – Consistent High Grade Basal Unit



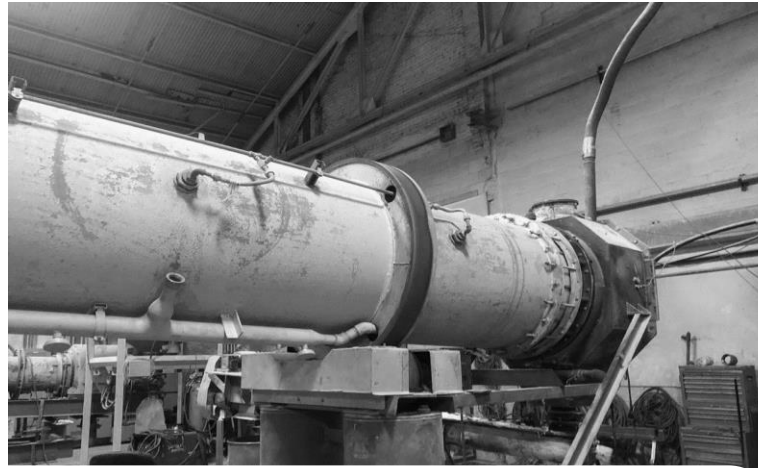
# Pilot Test Work De-Risks Project and Confirms Scalability



## 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



# CMB CIRCUIT



# One of The Highest Grade 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
- Gabarintha 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>**

**MINING  
RESERVE**

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

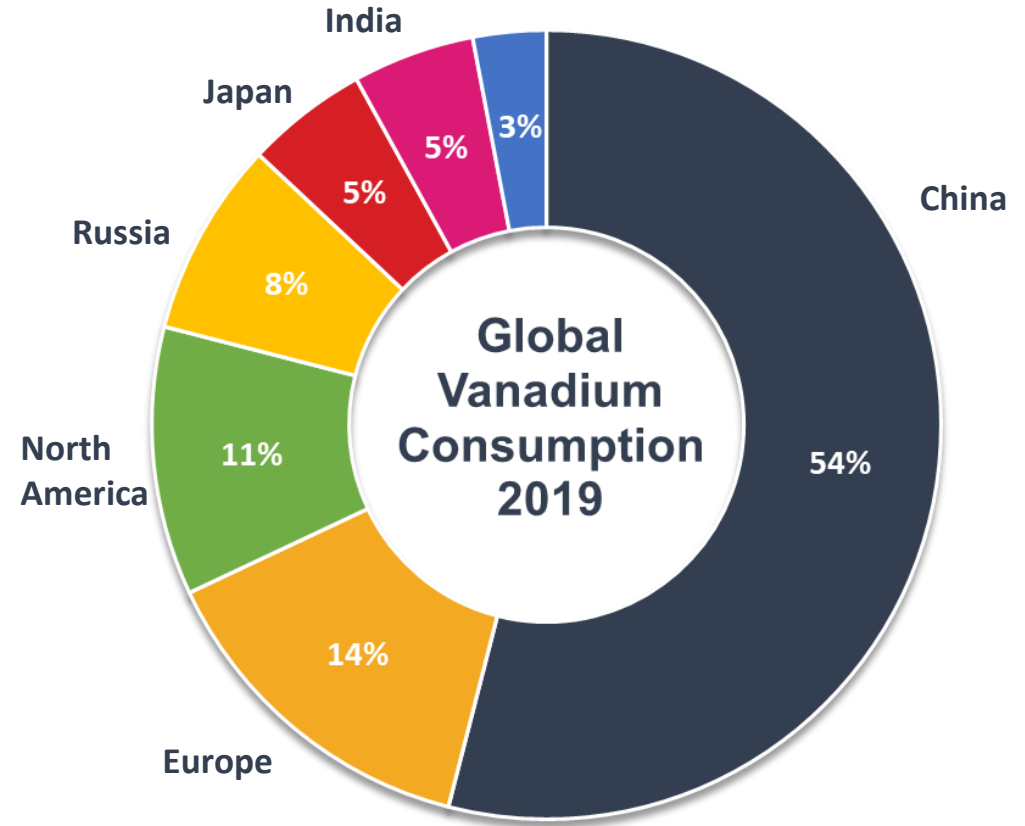
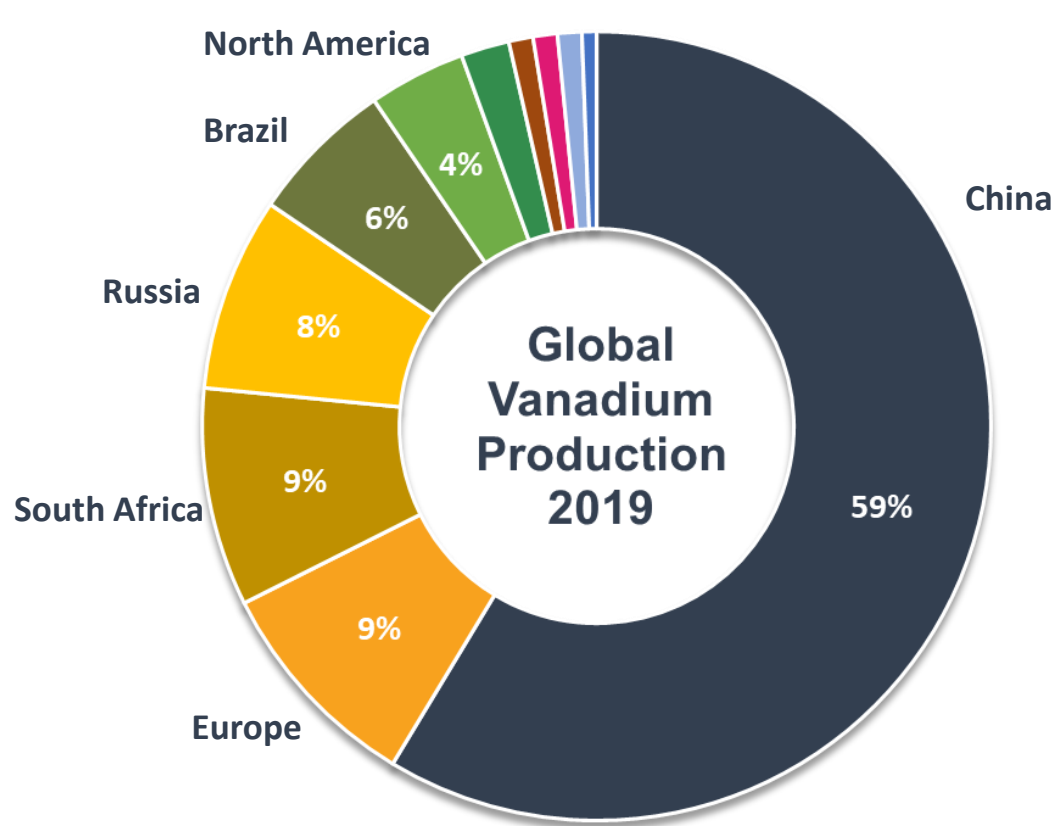
| Material Type                   | Classification            | Mt           | V <sub>2</sub> O <sub>5</sub> % | Fe%         | Al <sub>2</sub> O <sub>3</sub> % | SiO <sub>2</sub> % | TiO <sub>2</sub> % | LOI%        | P%           | S%         |
|---------------------------------|---------------------------|--------------|---------------------------------|-------------|----------------------------------|--------------------|--------------------|-------------|--------------|------------|
| Massive Magnetite               | <b>Measured (North)</b>   | <b>1.2</b>   | <b>1</b>                        | <b>44.7</b> | <b>6.2</b>                       | <b>10.4</b>        | <b>11.4</b>        | <b>0</b>    | <b>0.009</b> | <b>0.2</b> |
|                                 | 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        |
|                                 | <b>Total Indicated</b>    | <b>25.8</b>  | <b>1.1</b>                      | <b>49.1</b> | <b>5.1</b>                       | <b>5.8</b>         | <b>12.8</b>        | <b>-0.3</b> | <b>0.007</b> | <b>0.2</b> |
|                                 | 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        |
|                                 | <b>Total Inferred</b>     | <b>48.1</b>  | <b>1.1</b>                      | <b>47.6</b> | <b>5.6</b>                       | <b>7.2</b>         | <b>12.5</b>        | <b>0.3</b>  | <b>0.008</b> | <b>0.2</b> |
|                                 | <b>Massive Global</b>     | <b>75.1</b>  | <b>1.1</b>                      | <b>48.1</b> | <b>5.5</b>                       | <b>6.8</b>         | <b>12.6</b>        | <b>0.1</b>  | <b>0.007</b> | <b>0.2</b> |
| Disseminated / Banded Magnetite | 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        |
|                                 | <b>Total Indicated</b>    | <b>12.6</b>  | <b>0.6</b>                      | <b>29.5</b> | <b>12.5</b>                      | <b>24.6</b>        | <b>7.7</b>         | <b>2.8</b>  | <b>0.027</b> | <b>0.2</b> |
|                                 | Inferred (North)          | 38.5         | 0.5                             | 27.1        | 12.7                             | 27.4               | 6.9                | 3.3         | 0.027        | 0.2        |
|                                 | Inferred (South)          | 11           | 0.6                             | 27.7        | 13                               | 25.9               | 7                  | 2.7         | 0.015        | 0.3        |
|                                 | <b>Total Inferred</b>     | <b>49.5</b>  | <b>0.5</b>                      | <b>27.2</b> | <b>12.8</b>                      | <b>27.1</b>        | <b>6.9</b>         | <b>3.2</b>  | <b>0.024</b> | <b>0.2</b> |
|                                 | <b>Diss / Band Global</b> | <b>62.1</b>  | <b>0.6</b>                      | <b>27.7</b> | <b>12.7</b>                      | <b>26.6</b>        | <b>7.1</b>         | <b>3.1</b>  | <b>0.025</b> | <b>0.2</b> |
| <b>Combined</b>                 | <b>Global Combined</b>    | <b>137.2</b> | <b>0.9</b>                      | <b>38.9</b> | <b>8.7</b>                       | <b>15.7</b>        | <b>10.1</b>        | <b>1.5</b>  | <b>0.015</b> | <b>0.2</b> |

\*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.

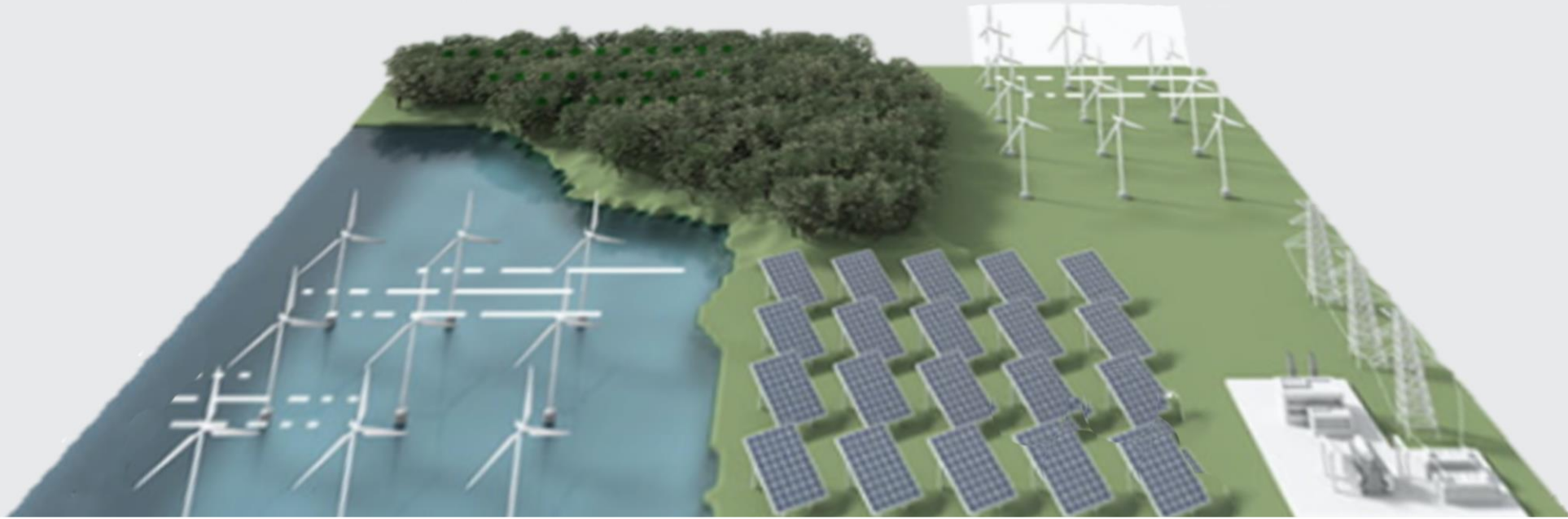


# Vanadium Supply / Demand



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

# VRFBs – The Solution for Grid Storage



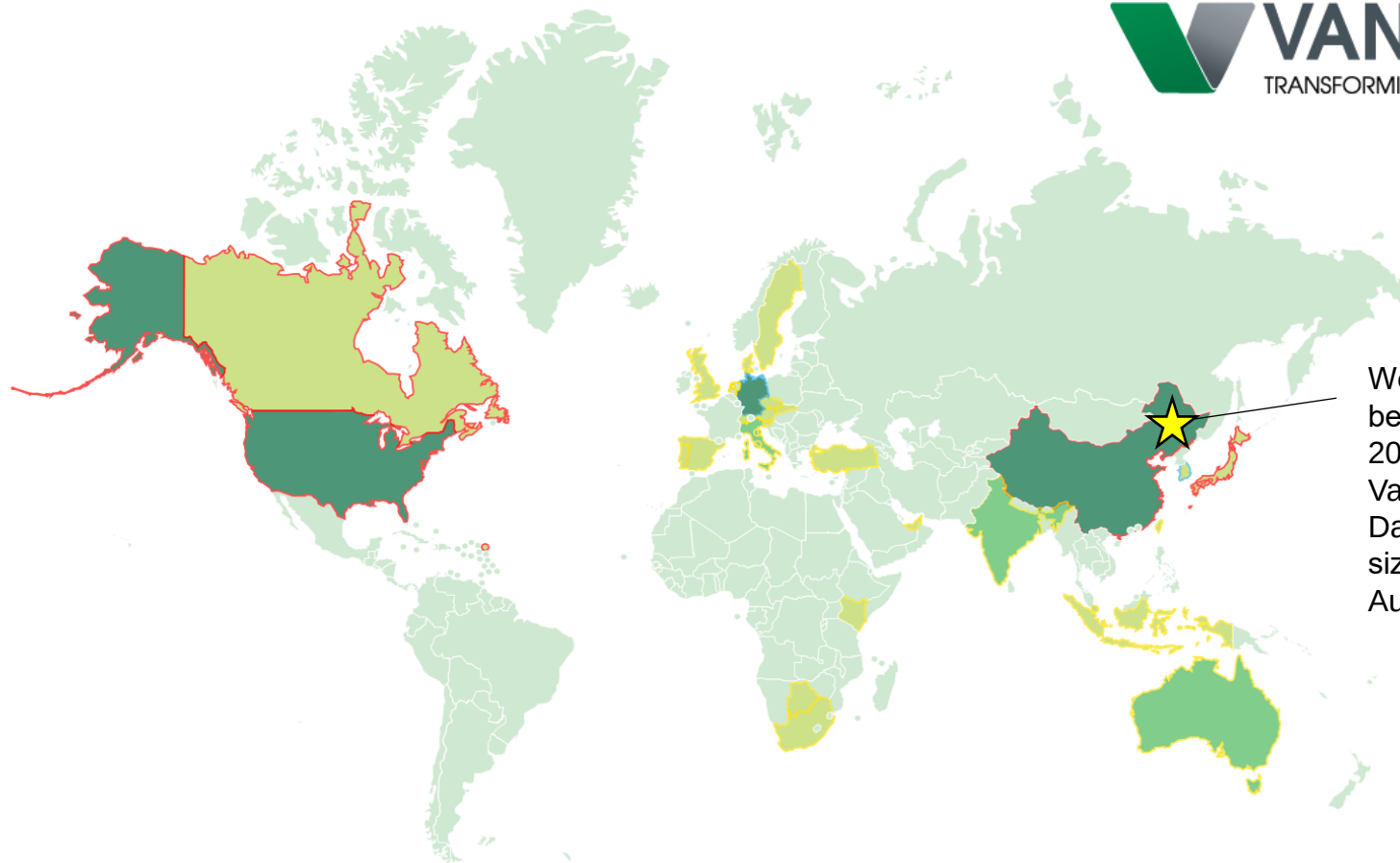
- Grid scale stationary storage solutions – peak shaving, regulating load frequency, driving grid efficiency.
- Ideally suited to renewable energy – contributing to the efficient roll out of green energy – able to time-shift large amounts of previously generated energy.
- Lifespan of +20 years with very 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

| Country      | VRFBs | kW     | kWh       |
|--------------|-------|--------|-----------|
| Australia    | 7     | 945    | 4,629.90  |
| Barbuda      | 1     | 3,000  | 12,000.00 |
| Botswana     | 1     | 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    | 740.15    |
| Indonesia    | 2     | 400    | 500.00    |
| Italy        | 5     | 631    | 2,610.00  |
| Japan        | 5     | 2,330  | 7,481.00  |
| Netherlands  | 1     | 10     | 80.00     |
| Portugal     | 5     | 5      | 60.00     |
| Singapore    | 1     | 250    | 2,000.00  |
| Slovenia     | 1     | 10     | 45.00     |
| South Africa | 2     | 745    | 2,950.00  |
| South Korea  | 5     | 1,250  | 4,900.00  |
| Spain        | 4     | 220    | 800.00    |
| Sweden       | 1     | 800    | 1,800.00  |
| Switzerland  | 2     | 210    | 460.00    |
| U. Kingdom   | 5     | 805    | 5,180.00  |
| USA          | 17    | 7,418  | 33,173.70 |
| Austria      | 1     | 14     | 84.00     |
| Kenya        | 1     | 140    | 84.00     |
| Slovakia     | 2     | 107    | 640.00    |
| UAE          | 1     | 10     | 40.00     |
| Taiwan       | 1     | 125    | 750.00    |
| Turkey       | 1     | 10     | 40.00     |

Last updated 30- 04 - 2019



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)

113 VRFB Installations globally

39,664 kW of power

209,800 kWh of energy

● 1 - 5 VRFBs

● Number of VRFBs  
● 6 - 10 VRFBs

● > 11 VRFBs

● 1 - 1000 kW

● Size of VRFBs in Kilowatts  
● 1001 - 2000 kW

● > 2000 kW

# 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 <https://www.cellcubeenergystorage.com/cube-press-release-5142019>.

| 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 / Planned |                         |                 |             |                               |                      |
| <b>50MW, 200MWh</b>       | <b>Port Augusta, SA</b> | <b>CellCube</b> | <b>2020</b> | <b>Pangea Storage Project</b> | <b>Network</b>       |
| Unknown                   | East Pilbara, WA        | VSUN            | 2020        | Strelly Community School      | Standalone           |



- Operating
- Planned