



## Technology Metals (TMT AU, \$0.35, market cap \$51.6m)

### Initial testwork demonstrates the potential for Yarrabubba to produce a titanium-rich by-product and further enhance project economics

- TMT's 100% owned Tier 1 Gabanintha vanadium-bearing magnetite project is located some 40km south of Meekatharra, in WA's Murchison region. Gabanintha is amongst the higher grade deposits of its type outside the Bushveld of South Africa. Total resources are 137mt at 0.9% V<sub>2</sub>O<sub>5</sub>.
- TMT management has looked at opportunities to develop Gabanintha using a staged approach. Initial test work of representative mineralisation has confirmed that a high iron (>64%) vanadium rich (1.7% V<sub>2</sub>O<sub>5</sub>) magnetite product can be produced at ca. 50% mass recoveries from the southern orebody (since renamed Yarrabubba). This appears to be an attractive, high grade feedstock for one of the many North Asian steelmakers which produce a vanadium by-product. Capex is likely to be significantly lower than earlier projections of over \$450m.
- As we flagged in our recent report, Yarrabubba also has the potential of producing a titanium rich (likely ilmenite) concentrate to be sold as feedstock to the Asian pigment industries. The average TiO<sub>2</sub> content of the Yarrabubba resource is 9.9%, with over 12% in the massive magnetite ore types.
- TMT has just reported initial test work aimed at separating a titanium concentrate from the non-magnetic stream of the proposed Yarrabubba flowsheet. This has met with success, with the production of concentrate grades well over 40%. The finer grind sizes have yielded concentrate grades approaching 50%. Given this is the first round of testing of Yarrabubba ores, we find this very encouraging.
- While it is too early to derive precise estimates of a potential production level, we believe it could be material to the project.
- The following table provides a first pass estimate of the revenue impact of an ilmenite concentrate on the Yarrabubba project. In this we assume:
  - Mill throughput of 3mtpa (see our November report for more details)
  - TiO<sub>2</sub> content of 9.9% (resource grade of massive and disseminated)
  - 50% recovery of a magnetic fraction. (Tails production of 1.5mtpa)
  - Very fine ilmenite (<38 micron) to be discarded as it can be difficult to concentrate and might be harder to sell. We assume 50% is <38 micron.
  - 60% recovery of ilmenite in the >38 micron fraction. (Test work presented in TMTs 4 December report suggests it might be higher than this).
- The revenue impact could be quite significant for the project. With a pricing assumption of US\$200/t (ilmenite is currently >US\$250/t) the production of 170-180ktpa could contribute an additional 15% to revenue, employing what we consider to be quite conservative assumptions.
- The incremental impact on the project's NPV could be even greater as the ilmenite product would need only to carry costs associated with gravity concentration of the tails and haulage to the port.
- Further test work is ongoing to refine recoveries and assist with the design of a metallurgical flow sheet. This will allow the production of samples to test the suitability of Yarrabubba ilmenite for the pigment feedstock market.

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## Production and revenue assumptions

Mill throughput	Mtpa	3.0
Recovery of magnetics	%	50%
Non magnetic tails production	Mtpa	1.5
TiO <sub>2</sub> content of resource	%	9.9%
Inferred TiO <sub>2</sub> content of tails	%	19.8%
Inferred content of 50% concentrate (as ilmenite)	Ktpa	594
Assumed proportion >38 microns	%	50%
Assumed recovery of ilmenite from coarse fraction	%	60%
Coarse ilmenite production	Ktpa	178
Pricing assumption for 50% ilmenite	US\$/t	200
Annual impact on Yarrabubba revenue	US\$m	35.6
At FX of 0.70	A\$m	50.9
Estimated annual revenue, excl. ilmenite	A\$m	333.4
% of additional revenue attributable to ilmenite	%	15%

- We should stress that these are our estimates only, and are broadly based on results from the initial metallurgical test work completed by TMT and its consultants. Key issues to watch for from future releases include:
  - Required grind size and what this does to titanium recoveries.
  - Nature of the titanium minerals: is it all ilmenite (high value) or could some be titanomagnetite (low value)?
  - The size distribution of the ilmenite. Sulphate pigment producers are somewhat agnostic as the mineral is finely ground before processing; chloride producers require average sizes over 75 microns to avoid ‘blow over’.
  - The impact of impurities. Here we see the risk of vanadium in the final product as being the greatest risk. Neither sulphate nor chloride pigment producers want high levels of V<sub>2</sub>O<sub>5</sub> in their feedstock. Given vanadium is a co-product, this could emerge as an issue. High levels of chrome in the product can be an issue as well.

## Investment Overview

As we discussed in our November report the Yarrabubba project presents itself as an attractive opportunity for a relatively low capex/quick start up, as a lead in to the full Gabanintha vanadium project. At the moment we can only see the potential for a 7 year mine life, but additional resource potential is possible.

- Based on our conceptual analysis, we see Yarrabubba as a stand-alone Stage 1, vanadium-magnetite project, potentially fundable by a small company, with attractive returns and a sub-2 year payback based on our commodity price assumptions (including a V<sub>2</sub>O<sub>5</sub> price of US\$7/lb and 25% payability for the V<sub>2</sub>O<sub>5</sub>).
- Incorporation of revenues from a titanium feedstock by-product could further enhance returns.
- This we see as potentially an attractive starter for the larger, fully integrated high purity V<sub>2</sub>O<sub>5</sub> project, centered on the larger Northern Block deposits. The initial spend for Stage 1 could lift an otherwise high capital burden for the project, covering the cost of the comminution and magnetic separation and infrastructure (water, TSF, roads, camp and office).



- The Stage 2 project has been the subject of a detailed DFS. Stand alone, the project offered fair economic returns (pre-tax IRR of 21% at a US\$8.78/lb V<sub>2</sub>O<sub>5</sub> price). Staging the capex, and cashflow from Stage 1/Yarrabubba should enhance these returns considerably.
- The projects are well located, close to the mining center of Meekatharra with access to gas from APA Groups recently announced Northern Goldfields Interconnect Gas Pipeline (MOU in place) and 30km from the sealed National Highway. Ample water is available.
- The next steps are to finalise metallurgical studies, refine the process flowsheet, and to upgrade inferred resource to indicated and thereby increase the reserve base.
- A mining lease has been granted. Environmental permits are now on the critical path. A benefits agreement is currently being negotiated with Traditional Owners.
- An updated BFS is expected to be complete in 3Q21.
- At its current market capitalisation, TMT looks like an attractive opportunity for (1) an economic high vanadium magnetite business, taking advantage of current high iron ore prices and (2) the longer term optionality associated with a fully integrated vanadium project.
- We envisage ongoing rerating of TMT as critical hurdles are achieved and as confidence in product pricing evolves.

<b>TMT Capital structure</b>		
Issued capital	m	147.3
Options	m	17.6
Performance rights	m	1.8
Share price	\$	0.35
Market capitalisation	\$m	51.6
Cash (post recent placement)	\$m	9.2
Enterprise value	\$m	42.4
<b>Board</b>		
Michael Fry, Non-executive Chairman		
Ian Prentice, Managing Director		
Sonu Cheema, Executive director		

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Dr Chris Baker, an authorised representative of BSCP, certifies that the advice in this report reflects his honest view of the company. He has 29 years investment experience in wholesale capital markets. He worked as a mining analyst for brokers BZW and UBS for 11 years and has a further 16 years' experience as a mining analyst and portfolio manager with Colonial First State and Caledonia Investments. He now provides independent financial advice on a part time basis. He may own securities in companies he recommends but will declare this when providing advice. He currently owns shares in TMT. He is remunerated by BSCP but is not paid a specific fee for providing this report. BSCP, its directors and consultants may own shares and options in TMT and may, from time to time, buy and sell the securities of TMT.

**BSCP earned fees from the recent capital raising undertaken by TMT and were co-managers to the issue.**

## Appendix 1

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