

Simple Concept : One Mine

TNG

THREE HIGH VALUE, HIGH PURITY PRODUCTS

Today, our advancing and fast developing world relies on modern materials

- > Titanium Dioxide Pigments
- Vanadium Pentoxide
- > Iron Oxide



OVERVIEW

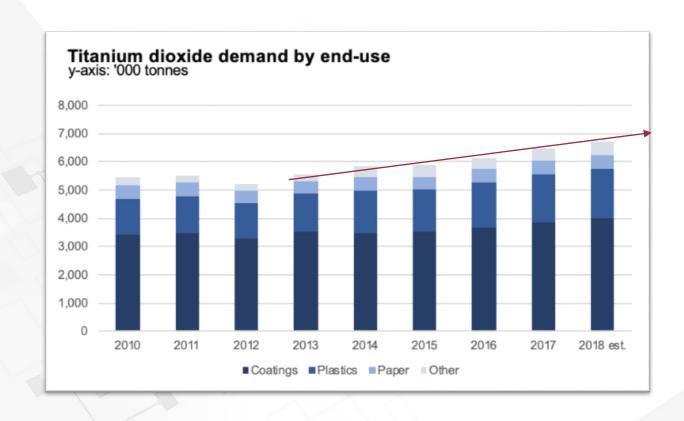


- Titanium dioxide, white pigment used globally
- Non- toxic and environmentally friendly
- Market worth US\$20 billion in 2019
- ▶ 60% used in paints, coatings, inks and enamels
- Global demand is estimated at 6.7 Mtpa
- Forecast growth at 4.1% CAGR
- Estimated 9 million tonnes by 2025



OVERVIEW







PROCESSING ROUTES

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- Older sulphate route uses H₂SO₄
- Typical sulphate feed is Ilmenite TiO₂ 52%, FeO 47%
- Iron waste causing environmental issues
- More modern chloride route uses Cl₂
- > Typical chloride feed is rutile TiO₂ 90%, FeO 10%
- FeO 2.3% MAJOR ADVANTAGE



TNG PRODUCTION AND OFFTAKE



- > TNG to produce of 100,000 tpa of pigment
- Only 1.5% of world demand
- Technology by Ti-Cons (Germany), a leader in TiO₂ technology
- Off-take Agreement with global leader DKSH (Switzerland)
- Low iron titanium feedstock
- Sustainable and environmentally friendly





Vanadium Pentoxide - V₂O₅

TNG

OVERVIEW

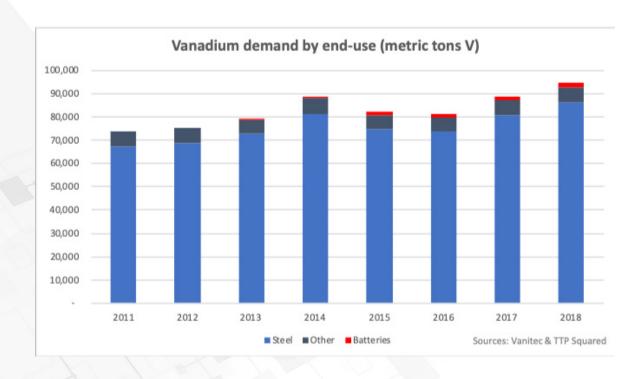
- Mined in China, Russia, South Africa and Brazil
- Over 90% is used in the steel industry
- > Strengthening agent, high tensile steel
- Recent regulations in China surge in demand
- \triangleright Global demand is estimated to be 160,000tpa V_2O_5
- Vanadium used in energy storage sector
- Vanadium redox flow batteries



Vanadium Pentoxide - V₂O₅

OVERVIEW





Supper alloys and flow batteries set to grow rapidly



Vanadium Pentoxide - V₂O₅

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TNG PRODUCTION AND OFFTAKE

- TNG's production of an average of 6,000 tpa of V_2O_5
- Represent 3.8% of the world's demand
- Very high purity V₂O₅
- Niche markets such as Vanadium Redox Flow Batteries
- Off-take Agreement with Woojin (Korea) for a minimum of 60% of TNG's production
- Woojin is the second largest Ferro-Vanadium exporter in Asia



Vanadium Redox Flow Batteries - VRFB

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THE FUTURE OF ENERGY STORAGE

Advantages of VRFB compared to Li-Ion batteries

- Better for large scale storage and for longduration applications (>6 h)
- More cost effective
- ➤ Longer life cycle 20 yrs vs 5-8 yrs (LIB)
- Lower degradation
- Simpler maintenance, safer



Source: Wattjoule

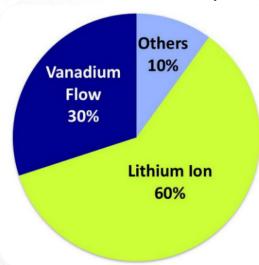
Vanadium Redox Flow Batteries - VRFB



THE FUTURE OF ENERGY STORAGE

Substantial Storage Market

Dominated by V-Flow and Li-Ion US\$50-100 Billion by 2025*



TNG has successfully produced high purity, commercial-grade, Vanadium Electrolyte



^{*} Source: Wattjoule

Iron Oxide - Fe₂O₃ OVERVIEW



- High purity hematite is used for steel production
- World demand of 104 million tpa
- Significant and fast growing demand in neighbouring Malaysia and Indonesia



Iron Oxide - Fe₂O₃

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TNG PRODUCTION AND OFFTAKE

- > TNG production of 500,000 tpa iron oxide
- > 0.5% of global market
- Fe content over 64.4%, strong premium over the benchmark 62% grade
- Malaysia and Indonesia easily absorb TNG's production
- Reduce logistical costs
- Negotiations are underway with potential off-take partners



Mount Peake Products

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PRODUCT SUMMARY

1. Titanium Dioxide Pigment (TiO ₂)		
World demand	6,700,000tpa	
TNG's average production	100,000tpa (1.5% of world demand)	
Main usage	Paint, plastics, paper and inks	



2. Vanadium Pentoxide (V ₂ O ₅)	
World demand	160,000tpa (equivalent of 90,000tpa V units)
TNG's average production	6,000tpa (3.8% of world demand)
Main usage	Steel, superalloys, chemicals, catalysts and energy storage (VRB)



3. Iron Oxide (Fe ₂ O ₃)	
World demand	104 million tpa (seaborne market)
TNG's average production	500,000tpa (0.5% of world demand)
Main usage	Steelmaking





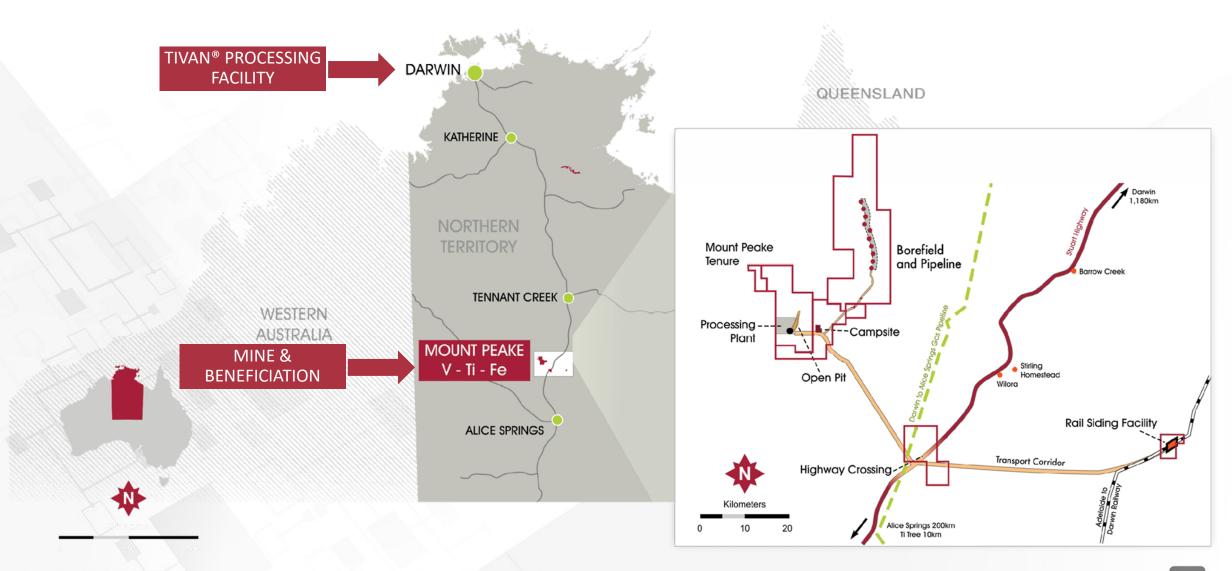
MOUNT PEAKE PROJECT

TNG LIMITED

Located in Excellent Jurisdiction

TNG

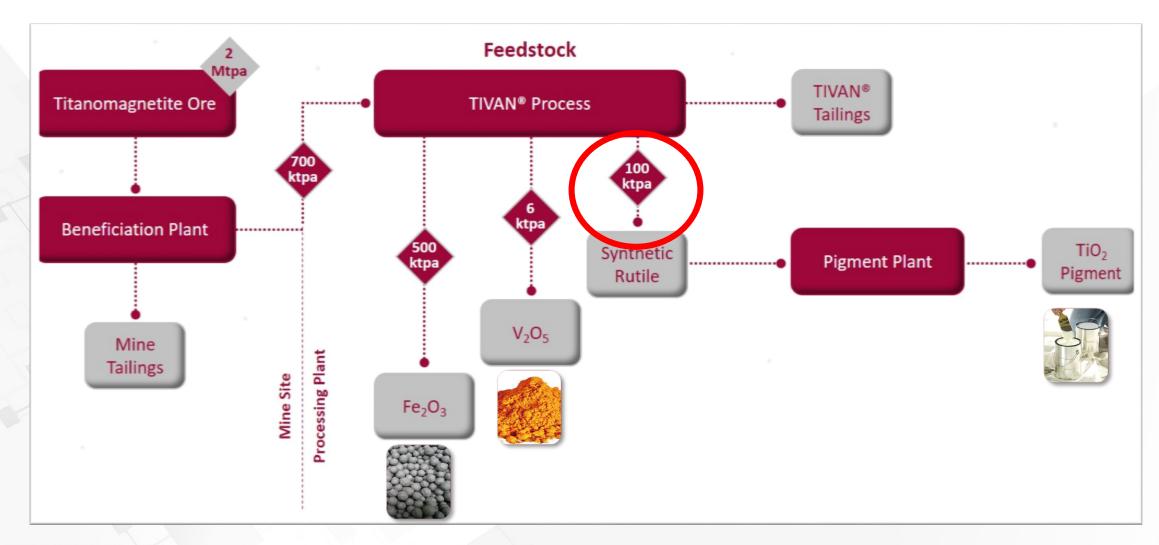
NEAR ALL KEY INFRASTRUCTURE



Vertical Integration Plan

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FROM PRODUCTION TO MARKET

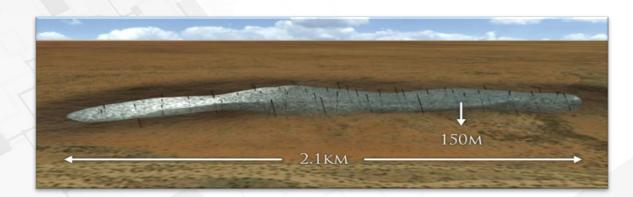


Mount Peake Deposit

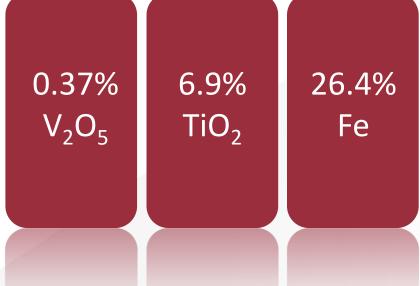
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LARGEST VANADIUM DEPOSIT IN AUSTRALIA

- ➤ Typical titano-magnetite composition
- Flat ore body with low strip ratio (0.9 to 1)
- Two high grade vanadium pits
- Mining via a conventional open pit operation
- >37 year mine life



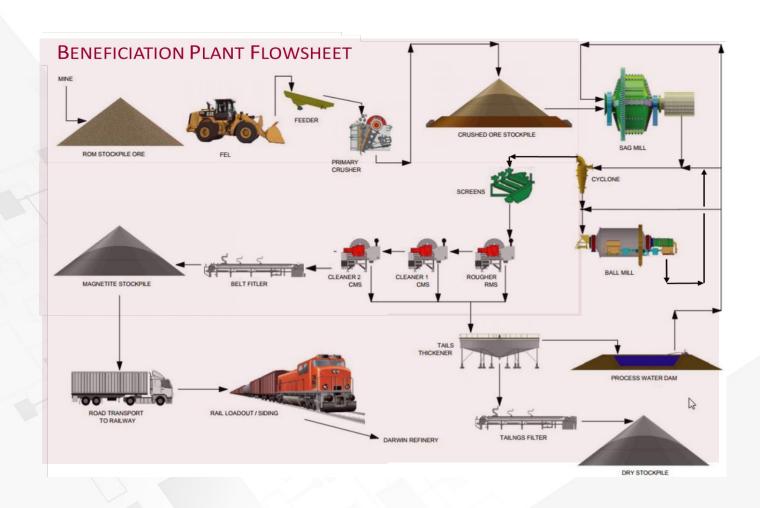




Mount Peake Beneficiation

DEFINITIVE FEASIBILITY STUDY DESIGN



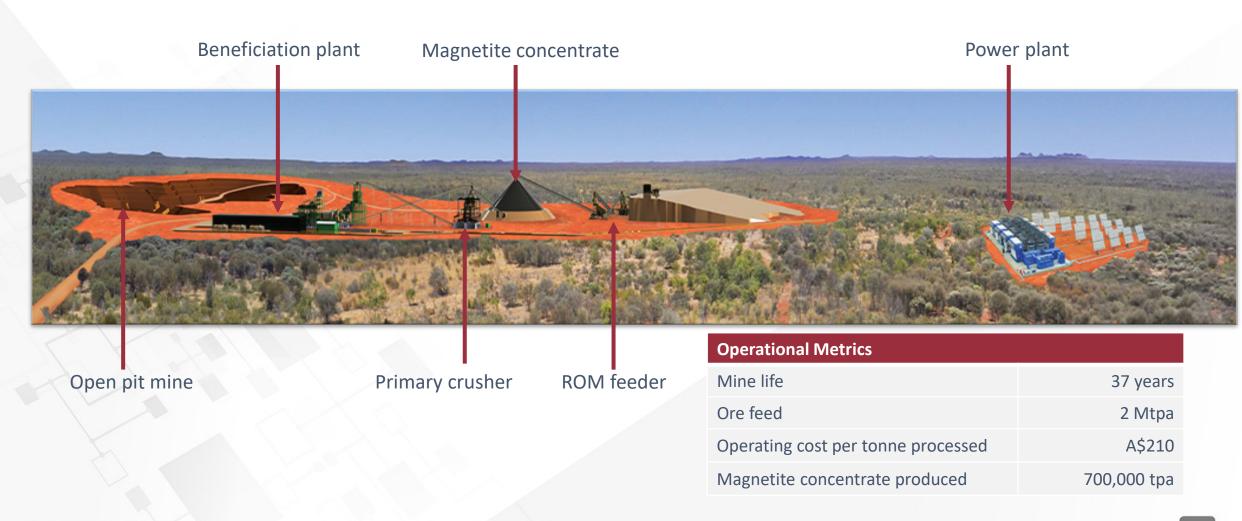


- 1. Open pit mining & primary crushing
- 2. SAG & ball milling
- 3. Screening and magnetic separation
- 4. Tailings management
- 5. Titano-magnetite to Darwin

Mount Peake Beneficiation

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DEFINITIVE FEASIBILITY STUDY LAYOUT



Mount Peake Developments

LARGEST VANADIUM DEPOSIT IN AUSTRALIA

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- ➤ DFS completed and FEED commenced
- ➤ Mining Management Plan ("MMP") submitted
- Environmental and project development approvals secured for the mine site
- Execution of a formal Native Title Mining Agreement
- ➤ Mineral leases granted







Logistics Mapping

OPTIMISED RAIL HAULAGE STRATEGY



Mine Fleet transport the Ore to the ROM Pad



Haulage of the Magnetite Concentrate to Rail Siding

Mount Peake

Beneficiation

Plant



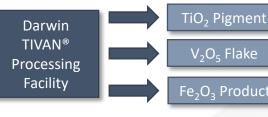
Magnetite Concentrate is railed to Darwin using existing rail infrastructure



Adnera Rail

Siding

Three high qualityhigh purity products are produced Three products are shipped to customers via Darwin East Arm Wharf





Customers









Downstream Processing in Darwin, NT

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EXCELLENT FACILITIES

- ► Middle Arm Peninsula of Darwin Harbour
- Close to railway line from Mount Peake
- ► Power generation and grid network capacity
- Gas supply available
- Concentrate storage & transport logistics
- Raw water supply and Infrastructure
- ► Port capacity and configuration
- ➤ Supportive NT government



GERMAN TECHNOLOGY



- Extraction of V, Ti and Fe from titano-magnetite
- ➤ SMS Group (Germany) has developed TIVAN® technology with TNG
- SMS will be the EPC contractor
- Fixed price, turn key delivery
- Throughput, process, product guarantee





GERMAN TECHNOLOGY

CONVENTIONAL PROCESS = 1 PRODUCT

Titanomagnetite

Pyrometallurgical Process

V₂O₅ Flake or FeV

1 tonne **Titanomagnetite** Concentrate

6.93kg V₂O₅ = US\$176



US\$176

Pre-OPEX Estimate

TIVAN® PROCESS = 3 PRODUCTS

Mount Peake Titanomagnetite

TIVAN®

TiO₂ Pigment

V₂O₅ Flake

Iron Oxide Fines Fe_2O_3

1 tonne Titanomagnetite | **Concentrate**

 $8.53 \text{kg V}_2 \text{O}_5 = \text{US} \$ 217$

128kg TiO₂ = US\$461

708kg Fe₂O₃ = US\$72

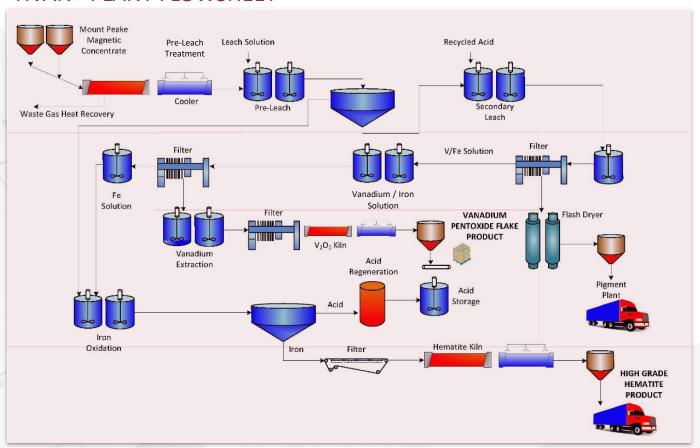
US\$750

Pre-OPEX Estimate

GERMAN TECHNOLOGY

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TIVAN® PLANT FLOWSHEET

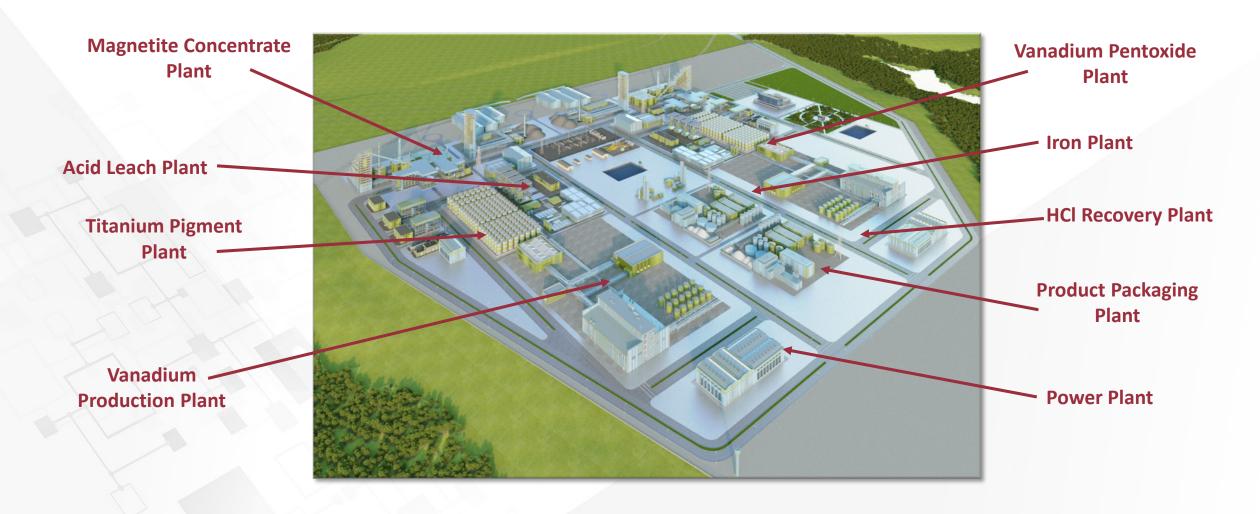


- 1. Pre-leach treatment
- 2. Acid leach
- 3. Non soluble Ti is filtered & dried
- 4. Filtration of vanadium
- 5. Vanadium pentoxide production
- 6. Iron removal and Fe production
- 7. Acid re-generation and recovery

Updated optimised process plant flowsheet for TIVAN® products

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GERMAN TECHNOLOGY



Pigment Processing Technology Ti-Cons GmbH

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GERMAN TECHNOLOGY

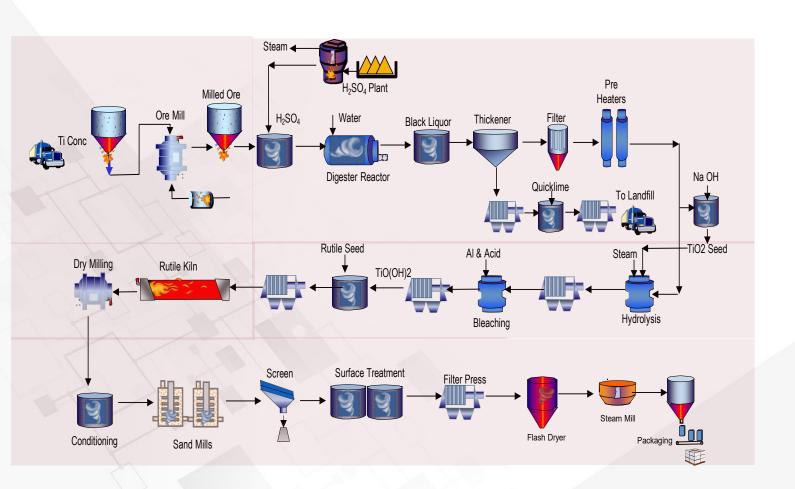
- ➤ Technology provider
- ➤ Technology package for titanium pigment production
- Built sulphate plants in Henan, Yunan
- Contracted by SMS Group
- >SMS will be the EPC contractor
- Fixed price, turn key delivery
- Throughput, process, product guarantee



Pigment Processing Technology Ti-Cons GmbH



GERMAN TECHNOLOGY



- 1. Preparation of Ti feedstock
- 2. Sulphation of Ti feedstock
- 3. Hydrolysis to Ti Hydroxide
- 4. Calcination to Rutile
- 5. Milling and surface treatment
- 6. Micronising and packaging

Pigment Processing Technology Ti-Cons GmbH



GERMAN TECHNOLOGY

	Sulphate	Chloride	TNG
Raw material cost (\$/ton of TiO ₂ feed)	Low Ilmenite	High Rutile	Very Low Tivan
TiO ₂ final product	Medium purity	High purity	High purity
Capital expenditure	High	Medium	High
Operational costs	Medium	High	Medium
Environmental	High	Medium	Low
Flexibility in processing raw material	Limited (Fe, Cr)	Limited (CaO, MgO, size)	Tivan feedstock
Process Condition	Medium temp. (140-180°C)	Very High temp. (800-1,400 °C)	Medium temp. (140-180 °C)
TiO ₂ Pigment production	Rutile/Anatase	Rutile	Rutile/Anatase

FS Project Economics

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A SINGLE-STAGE 2 MTPA DEVELOPMENT

Operational Metrics	
Mine life	37 years
Ore feed	2 Mtpa
Operating cost per tonne processed	A\$210
Magnetite concentrate produced	700,000 tpa
V ₂ O ₅ produced	6,000 tpa
Titanium pigment produced	100,000 tpa
Fe ₂ O ₃ produced	500,000 tpa

Financial Metrics	
Pre-tax NPV _{8%}	A\$2.8 billion
IRR pre-tax	33%
Payback period	2.8 years
Pre-tax net annual operating cash flow	A\$359 million
Pre-production CAPEX	A\$824 million

Notes

Updated FEED Model assumptions include long-term A\$:US\$ exchange rate of 0.70; updated long-term price assumptions of US\$25,400/tonne for V_2O_5 (US\$11.50/lb), US\$3,600.00/t TiO₂ pigment and US\$102.00/tonne for high grade Fe_2O_3 . Includes lease repayments

ALL prices and outcomes are indicative only while FEED is progressing and is an interim study, not final.

Project Funding Partnerships

GERMAN BANK MANDATED

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- ➤ Debt funding mandate awarded
- >KfW IPEX-BANK to raise up to US\$600m (AU\$850m)
- Export credit finance
- > Specialist Financier
- Extensive expertise in Metals & Mining



Corporate Snapshot

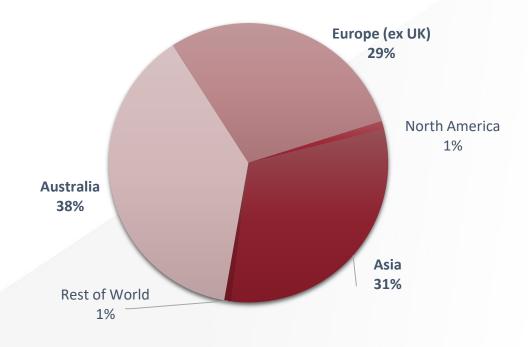


TOP SHAREHOLDERS	
DEUTSCHE BALATON & ASSOCIATES* German Investment Fund	12.28%
VIMSON GROUP Indian iron ore mining conglomerate	9.84%
WWB INVESTMENTS P/L Private investor	7.34%
AOSU INVESTMENT & DEVELOPMENT CO Chinese Private Company	5.00%
SMS INVESTMENTS SA Mount Peake development partner	1.31%

CORPORATE	DATA
ASX code	TNG
Cash as at 30 Sep 19	\$20.8 million
Shares on issue	1.12 billion
Market capitalisation (at 9c)	\$101.2 million

TOP 50 SHAREHOLDERS BY LOCATION

Top 50 = 51% of TNG Total Issued Capital



^{*} It includes DELPHI, the major shareholder of Deutsche Balaton, and Sparta AG, a subsidiary of Deutsche Balaton.

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COMPETENT PERSON'S STATEMENTS

- ► The information in this report that relates to the Mount Peake Mineral Resource estimates is extracted from an ASX Announcement dated 26 March 2013, (see ASX Announcement 26 March 2013, "Additional Information on the Mount Peake Resource", www.tngltd.com.au and www.asx.com.au), and was completed in accordance with the guidelines of the JORC Code (2012). Initial mining and financial assessment work, based on the Mineral Resource, followed (see ASX Announcement 15 July 2013, "TNG Considers Two-Stage Development Option for Mount Peake Project, NT", www.tngltd.com.au and www.asx.com.au). The Company confirms that it is not aware of any new information or data that materially affects the information included in the original market announcement and that all material assumptions and technical parameters underpinning the Mineral Resource estimates in the relevant market announcement continue to apply and have not materially changed. The Company confirms that the form and context in which the Competent Person's findings are represented have not been materially modified from the original market announcement.
- ► The information in this report that relates to the Mount Peake Ore Reserve estimates is extracted from an ASX Announcement dated 31 July 2015, (see ASX Announcement 31 July 2015, "Mount Peake Feasibility Results", www.tngltd.com.au and www.asc.com.au) and was completed in accordance with the guidelines of the JORC Code (2012). The Company confirms that it is not aware of any new information or data that materially affects the information included in the original market announcement and that all material assumptions and technical parameters underpinning the Ore Reserve estimates in the relevant market announcement continue to apply and have not materially changed. The Company confirms that the form and context in which the Competent Person's findings are represented have not been materially modified from the original market announcement.

PRODUCTION TARGETS AND FINANCIAL INFORMATION

▶ Information in relation to the Mount Peake Definitive Feasibility, including production targets and financial information, included in this report is extracted from an ASX Announcement dated 11 September 2019 called "Optimised Delivery Strategy for Mount Peake" available on the Company's website on www.tngltd.com.au. The Company confirms that all material assumptions underpinning the production target and financial information set out in the announcement released on 11 September 2019 continue to apply and have not materially changed.





BUILDING A GLOBAL STRATEGIC METALS COMPANY

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