



AUSVAN

B A T T E R Y M E T A L S

Management Presentation

Developing the World's Next Large Scale
Vanadium + HPA Project

June 2020

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A Exceptional Investment Opportunity

- **Large Scale & High-Grade Deposit**

One of the world's largest Vanadium deposits, located in north-west Queensland, Australia containing a significant JORC resource of **618Mt at 0.45% V₂O₅** supporting a **50+ year mine life**. Resource is open in all directions, projecting to surface in the east.

- **Low Cost Mining**

Vast and **gently dipping deposit** with **stable grade** and **depth** of cover from 28m with soft **free-dig** overburden supports low mining costs. Exploration vectors indicate opportunity for higher grades and lower strip ratios to the east of existing resource.

- **Proven Processing Technology**

Proven PFS-level flow sheet supports a clear pathway to full V₂O₅ and HPA production.

- **Strong Economic Potential**

Desktop modelling of detailed production flow sheet indicates viability of a atmospheric leach process with an IRR of >24% and an after-tax NPV of >A\$ 260M, assuming current Vanadium and HPA prices*

- **Strong Long-Term Market Dynamics**

Demand for Vanadium Redox Flow Batteries is rapidly increasing because of demand from utilities for low-cost static batteries/energy storage of green energy solutions as well as changing Chinese environmental regulations. HPA market is expected to grow at 30% CAGR because of use in the EV Market.**

**as of April 20,2020, **CRU HPA Outlook 2019*

Overview & Portfolio Summary

Project information:

- JORC Inferred Resource of 618Mt at 0.45% V_2O_5 and Exploration Target of 1,100Mt. The Vanadium Resource includes grades of 0.78% V_2O_5 .
- The resource remains open in all directions, Progressively shallower to the east where it daylights. Clear opportunity to **increase the tonnage with near surface high grade, enriched oxide zones** to the east of current resource as well as increasing global tonnage.
- **Potential HPA co-product** with grades averaging 6%-7 (up to 13%) Al_2O_3 with HPA value of. >A\$800/ROM t recovered into leach solution during standard vanadium flowsheet.
- **High beneficiation recoveries of 72% V and 79% Al to the concentrate** and acid leaching recoveries of 87% V_2O_5 and 55% Al_2O_3 expected based on recent metallurgy processing test work on the near by Debella Vanadium deposit, (with the same chemistry and focus).
- **Expedited process to completing a Scoping Study within 3 months**

Location & Region

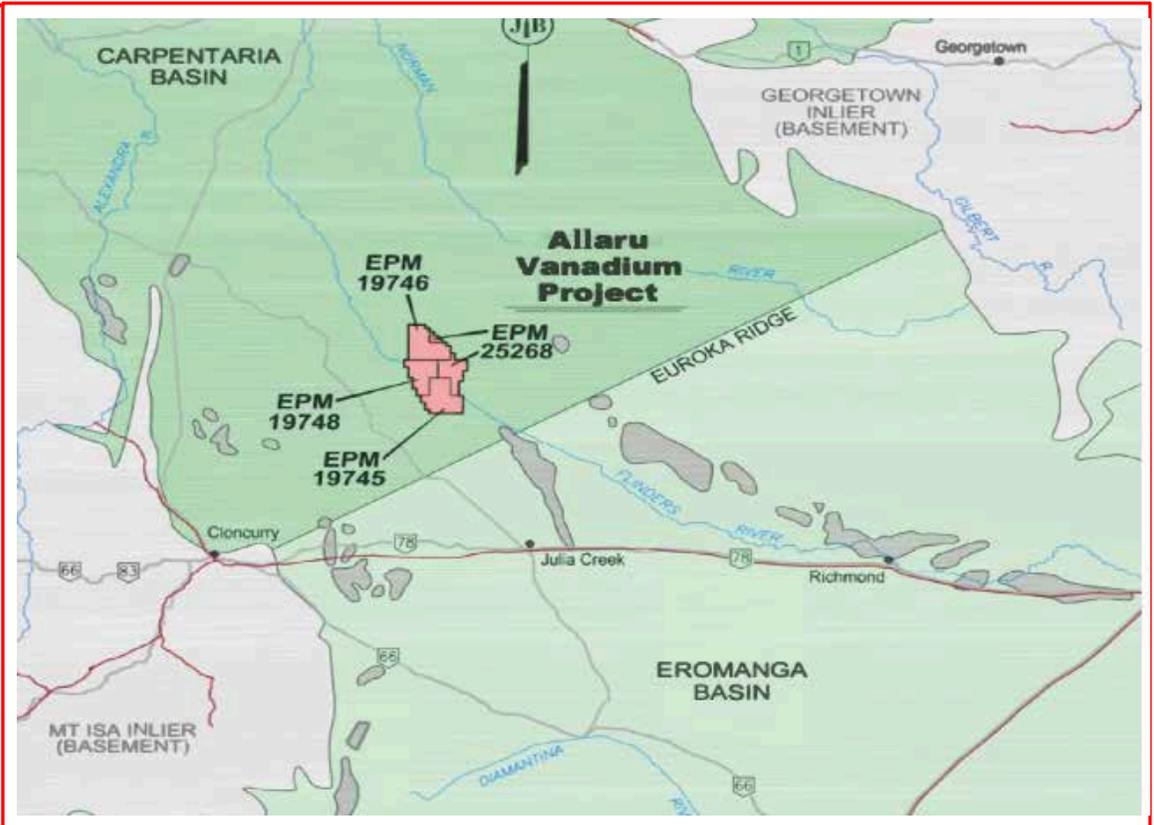
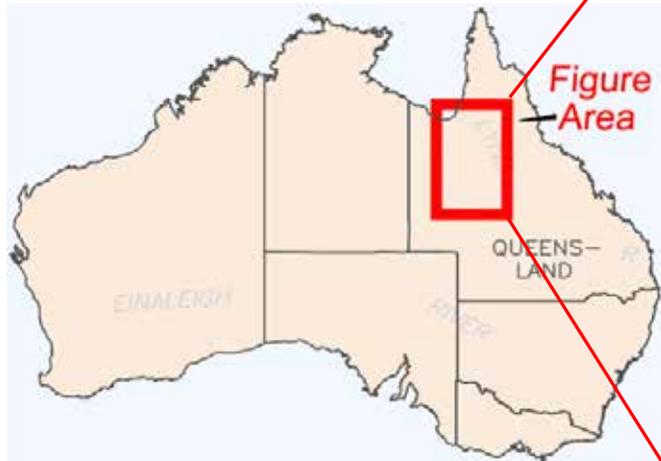


- Attractive regional setting within the Mt Isa Minerals Province, home to world renowned mines including South 32's Cannington Mine and Glencore's Mount Isa Mine.
- Queensland has a clear and effective process for resource development permitting.
- The Projects are situated close to existing infrastructure, including roads, rail and power.

Snapshot

- AusVan Battery holds a 100% interest in four exploration permits (“EPs”) which constitute the Allaru Project area (810km²).
- Significant drilling programs on the project defined the large Inferred Resource and provide geological control across the project area.
- Located within the renowned Mt Isa minerals province, the Projects are nearby to tenements owned by Rio Tinto and South 32.

Project Location & Map



Allaru Project (QLD) Overview

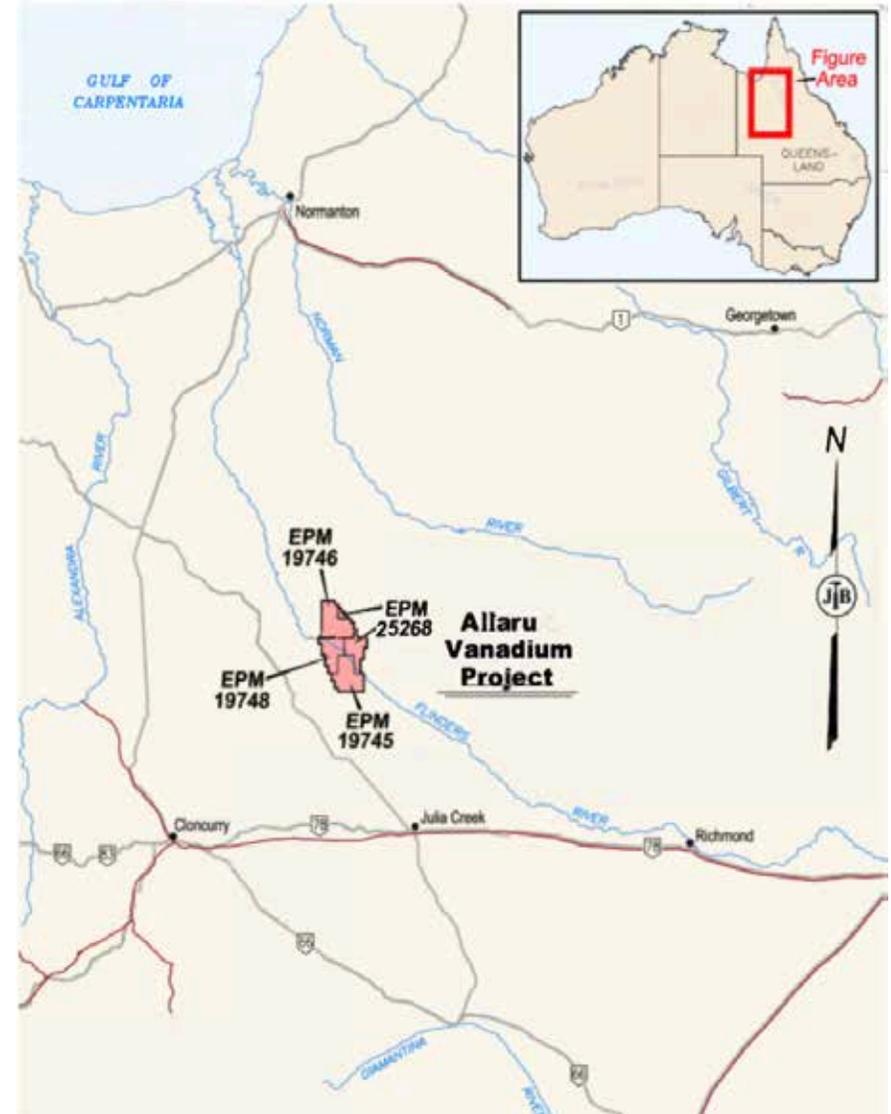
Overview

- The Project is located in Queensland and contains:
 - 618Mt JORC Resource at 0.45% (including grades of 0.78% and 0.64%) and
 - Al₂O₃ grades averaging 6% - 7% with higher grades of 17%-20% expected in the roof.
- It is located within close geographic proximity (c.40km) to the advanced Debella Project and displays similar geological characteristics.
- Vecco Industrial undertook a drilling program in 2015 which, in combination with previous programs, has enabled the development of an extensive regional data set.
- A JORC resource report was completed by John T. Boyd Company in 2018 and demonstrates a large and high-grade deposit in addition to a globally significant Exploration Target.
- Next steps for the project include additional drilling to the East and North- East to target shallow extensions of the existing JORC Inferred Resource and convert the Exploration Target to a JORC Resource.

Topography



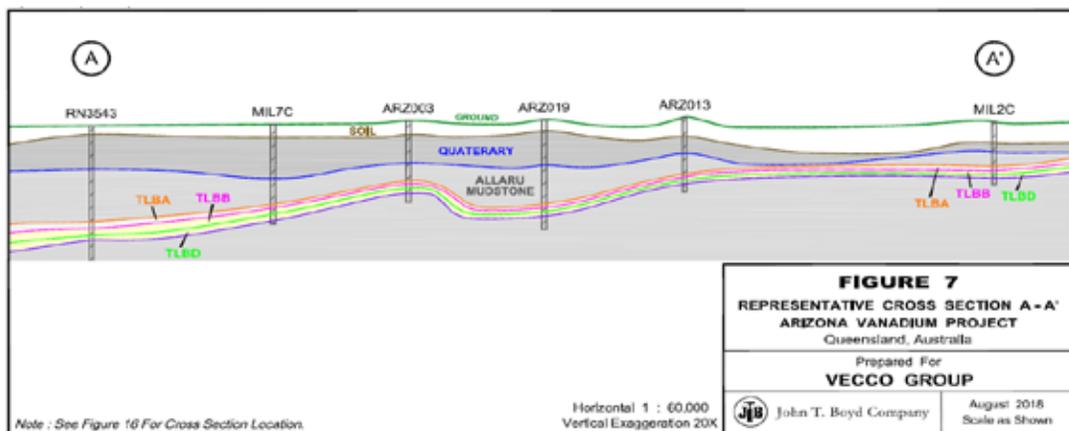
Tenement Map



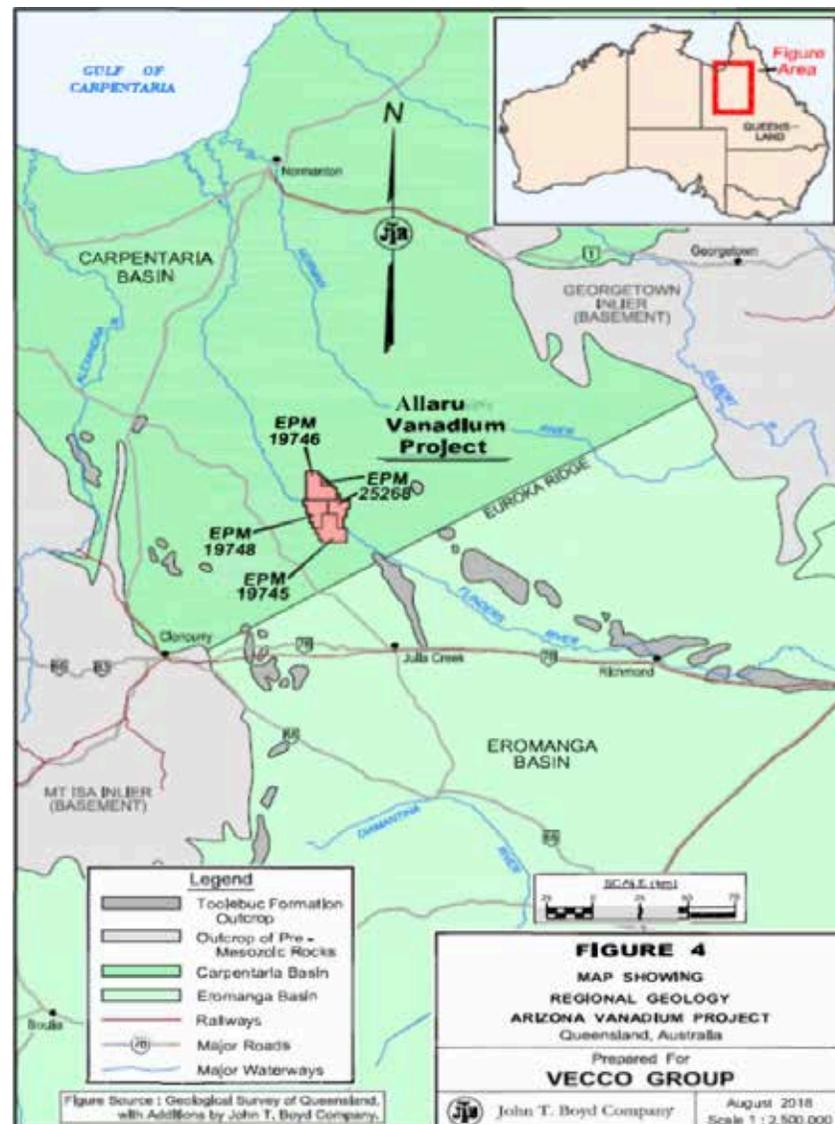
Geological Summary

- Allaru displays similar geological characteristics to the nearby advanced Debella Vanadium + HPA Project. Shallower mineralisation exists to the East and North-East which are to be targeted in follow up drilling in late 2019.
- Allaru is a sedimentary deposit, with the resource hosted in Cretaceous Toolebuc Formation. The majority of the ore body is contained within the shallow weathered zone. Primary vanadium enrichment occurs in the shale portion of the formation.
- The Toolebuc formation is composed of banded shelly limestone and shales. It is widely distributed and laterally stable across the formation.
- The formation consists of a roof ply (TLBA), two ore body plys (TLBB, TLBD) and an inferior floor ply (TLBE).
- Grades have been composited across the ore body range and are characterised by high consistency across the formation.
- The representative section through the deposit is shown below and the representative stratigraphic profile is shown on the following page.

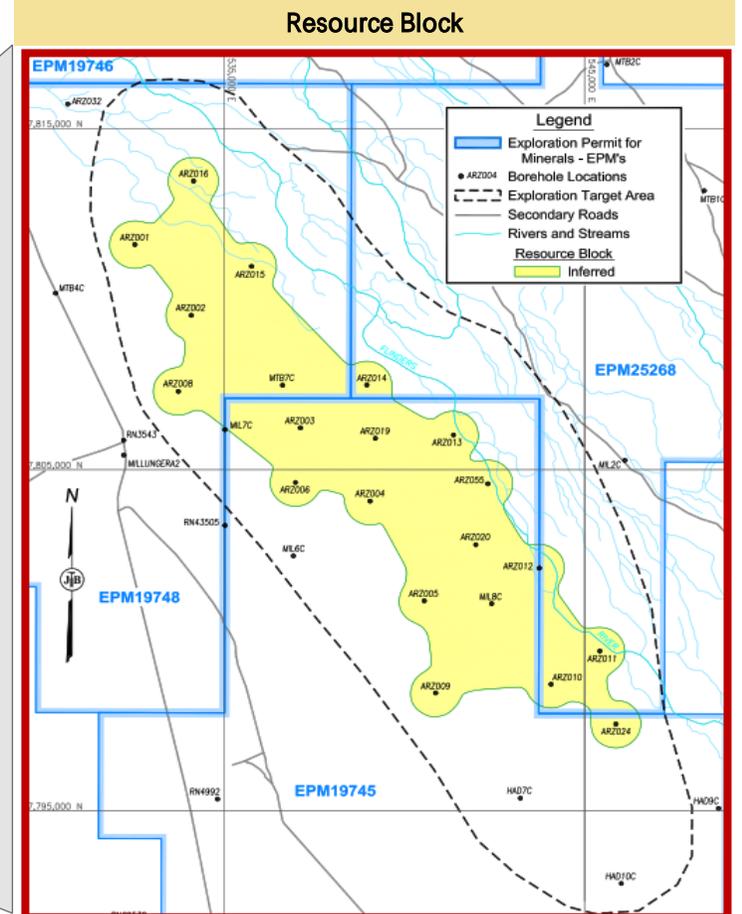
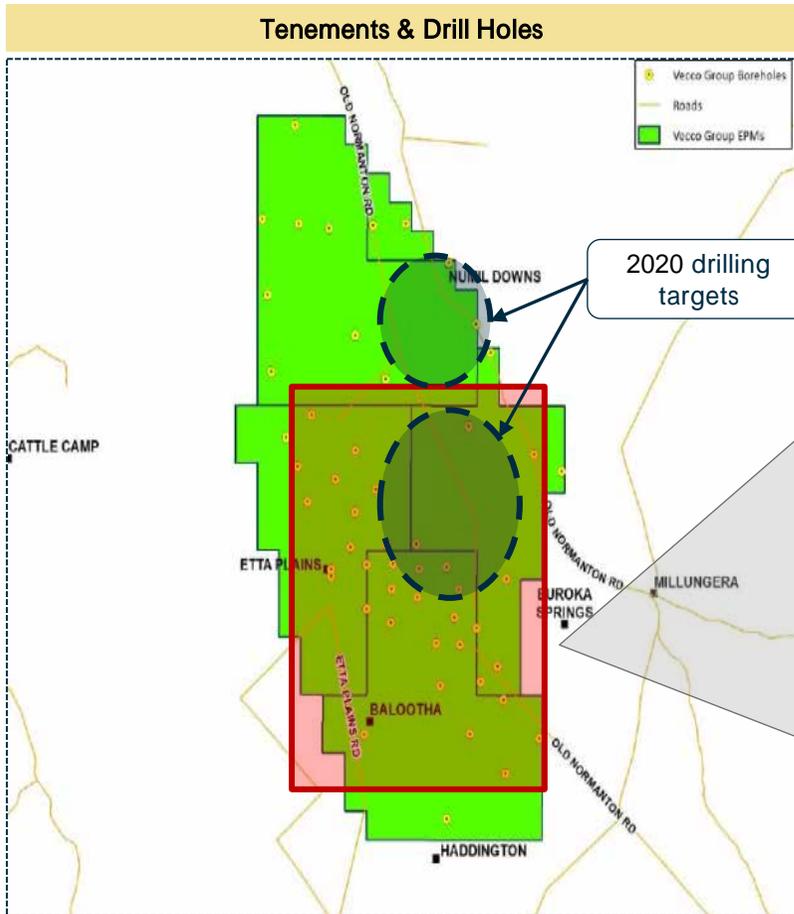
Allaru – Cross Section



Regional Geology



Allaru JORC Resource									
	Resource (Mt)	V2O5 Grade %			Al2O3	Area (Km ²)	Depth (m)		Thickness (m)
		Low	Ave	High	Ave		Low	High	Ave
Inferred	618	0.38	0.45	0.52	-	72.5	37.3	85.3	4.6
Exploration Target	850-1,100	0.36	0.45	0.50	-	125	28.2	87.7	4.7
Total	1,468 – 1,718					197.5			



Allaru Project Represents a World-Class Vanadium Asset

Company	Project	Stage	Resource Tonnes (Millions)	Resource Grade
<i>AusVan Battery</i>	<i>Allaru Project</i>	<i>Exploration</i>	<i>618</i>	<i>0.45% plus HPA</i>
Atlantic	Windimurra	Development	235	0.49
Vanadium Resources	Steelpoortdrift	Development	612	0.78
TNG	Mt. Peake	Development	160	0.28
Australian Vanadium	Gabanintha	Development	176	0.77
Technology Metals	Gabanintha	Development	120	0.8
Largo	Maracas	Production	49.25	0.99
Bushveld	Vametco	Production	187	0.78
Vanadium Corp	Iron-T VTM Project	Exploration	14	0.45

Allaru Project Stands Out Amongst All Peers on Project Scope and Resource Grade

Robust Economics Framework Provides Path To Development

Operational Metrics

Mine Life	51 Years
Total Production (kt V2O5)	161
Average Annual Production (kt V2O5)	3.16
Cash Costs (V2O5 only)	US\$/lb 3.71
AISC (V2O5 only)	US\$/lb 4.22

Financial Metrics

Post-Tax NPV _{8%}	A\$ 331 Million
Post-Tax IRR	22.70%
Total Development Capital	A\$189 Million
Total Sustaining Capital	A\$107 Million

Sensitivity Table

	12%	10%	8%
US\$5.00/lb	A\$121m	A\$183m	A\$274m
US\$6.00/lb	A\$171m	A\$243m	A\$350m
US\$7.00/lb	A\$220m	A\$303m	A\$426m
US\$8.00/lb	A\$269m	A\$363m	A\$502m
US\$9.00/lb	A\$319m	A\$424m	A\$578m
US\$10.00/lb	A\$368m	A\$484m	A\$654m

Notes:

Updated Model assumptions include long-term A\$:US\$ exchange rate of 0.70; updated long-term price assumptions of US\$6.30/lb for V2O5, US\$26.00/kg HPA (4N)

Overview

- AARC Environmental Solutions Pty Ltd (“AARC”) was commissioned by AusVan Battery to undertake a review of environmental factors.
- AusVan Battery’s projects have been granted the necessary environmental authorities which allow it to conduct progressive exploration activities as required.
- Given sparsely populated location and low impact use of land (cattle grazing), there are no significant environmental constraints to the Project.

Tailings

- Beneficiation tailings to be returned to the pit.
- Leaching tailings will not present storage or handling issues.

Environmental Factors

Consideration	Assessed as Non-Significant?	Actions Required
Land Use & Tenure	ü	Compensation agreement
Flora & Fauna	ü	None
Noise	ü	None
Air Quality	ü	Monitoring
Water	ü	Waste management approval, quality monitoring, usage permit
Waste	ü	Waste management approval
Native Title & Cultural Heritage	ü	Heritage surveys

Flora and Fauna



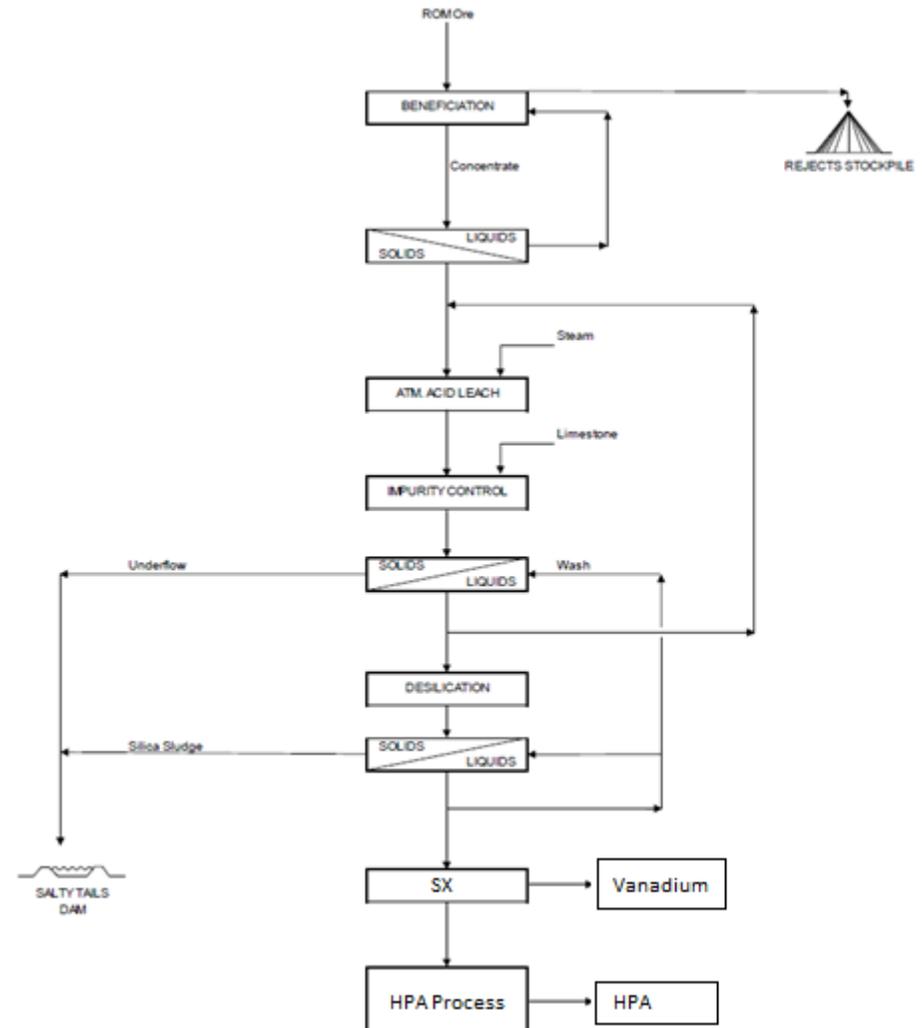
Overview

- AusVan Battery has engaged Brisbane Met Labs (BML) to conduct metallurgical test work on the extraction of vanadium and HPA from the host shale ore.
- Flotation followed by atmospheric leaching has been identified as a low capital and operational cost option.
- An SX process will follow the leaching stage for recovery of vanadium and HCl for HPA production.
- The flowsheet developed for Vanadium shale in the Toolebuc Formation is well understood, with extraction results supporting up to a **95% V2O5 leach recovery**.
- The flowsheet results in **79% Al₂O₃ recovery to float concentrate and leach recovery of 55% Al₂O₃** (in process with vanadium)
- An acid plant to accompany the project supports very low opex through cheap acid and creates power generation credits.
- Acid from the plant will also be used for vanadium electrolyte production.

Typical QXRD Analysis

Phase (Formula)	Weight (%)
Calcite; CaCO ₃	59
Quartz; SiO ₂	30
Muscovite; Ka ₂ (Si ₃ Al)O ₁₀ (OH, F) ₂	6
Chlorite; (Mg, Al, Fe) ₆ (Si, Al) ₄ O ₁₀ (OH) ₈	5
Montmorillonite; Ca _{0.2} (Al, Mg) ₂ Si ₄ O ₁₀ (OH) ₂ ·4H ₂ O	Trace

High Level Processing Flow Chart



Michael Collins P.Geo.

CEO and Director

- Mr. Collins has an exceptional skill set in project development and analysis which is supported by a wide industry network. Through his work as a geologist and running a mining engineering office in Vancouver he has developed knowledge and understanding of numerous mineral camps and deposit types around the world. More importantly he has developed a philosophy around minimizing time and costs in project development to drive value for shareholders.
 - His experience steps beyond mineral deposits with a breadth of experience in the feasibility process and the pitfalls of project construction and optimization. With over 14 years as an officer and director of public companies, Michael understands intricacies of building corporate structure, marketing and value accretion. Michael graduated with a BSc. Honours from Dalhousie University in 1996 and is an accredited P.Geo. with EGBC.
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Thomas Northcott

Director

- CEO of AusVan's predecessor group, Vecco Group, has worked in the vanadium resource development and the vanadium flow batteries development business for over 7 years.
 - Thomas is a lawyer with experience in the practical delivery of mining, energy and infrastructure projects throughout Australia. His expertise includes board and senior management positions in operational mining as well as exploration companies.
 - He has taken a lead role in small and large resource companies and large Government infrastructure projects. Thomas's insight regarding all aspects of company development from exploration to project feasibility assessment and development is well established. His experience includes corporate governance, project acquisitions and financing, mine planning and development (including rail, port, water and power), environmental approvals and compliance.
-

Blake Morgan

Managing Director

- Mr. Morgan has 15 years' experience in Mining and Heavy Industries, with 10 years dedicated to the Mining, Natural Resource Sector. During this time, he was employed as mine site Health and Safety, as well as Strategic Planning with responsibility for hundreds of employees. Mr. Morgan built a successful career with Rio Tinto, BMA Metals (subsidiary of BHP) and Santos Coal and Gas during that time.
 - He then made the successful transition from operations to executive/entrepreneurial pursuits after years of "boots on the ground" work. Gaining first-hand knowledge, culture, and an understanding of Mining Operations he then made the move from Australia to Canada. Mr. Morgan has been instrumental in building significant land packages, developing and financings for private resource exploration companies in British Columbia. He is committed to the exploration industry and enjoys the challenges and rewards which come from building corporate and shareholder wealth within it.
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Appendix

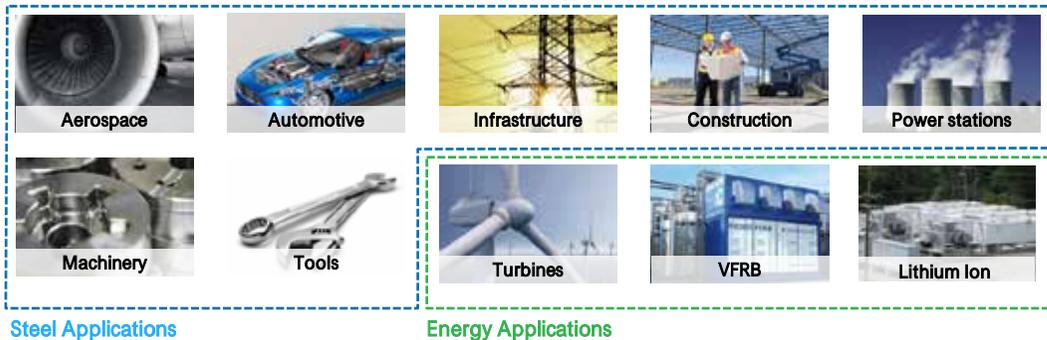


Vanadium Characteristics and Applications

Overview

- Vanadium is a high value metal that is defined by its ductile and malleable transition properties.
- ~98% of global ore reserves are found in China, Russia, South Africa and Australia⁽¹⁾.
- Given the rarity of ore deposits mined solely for vanadium, extraction is derived primarily as the by-product of ores that are mined for other minerals such as titanium and uranium. It is also produced as a by-product of steel-making, extracted from the slag created through the steel-making process.
- Vanadium is sold as either vanadium pentoxide or ferrovanadium alloy which are both used as strengthening agents in steel alloy production.
- The most common FeV alloy is FeV80% which, along with FeV60%, is produced by the aluminothermic reduction of vanadium in steel production. FeV40% is derived from slag by-product.
- China, Europe and North America are the largest consumers of vanadium, accounting for approximately 75% of total consumption⁽²⁾

Example Industry Uses



Primary Uses

Steel Alloy Production (>90%)

- Used as a strengthening agent in steel alloy production. This traditional use for vanadium is continuing to grow.
- Increases steel strength by up to 100% and reduces its weight by up to 30%.
- Accounts for >90% of total consumption⁽²⁾, consequently, the key factors influencing steel use (i.e. construction activity, infrastructure and urban development) are the primary drivers of vanadium demand.

Energy Storage (<10%)

- Vanadium Batteries (VBs) and Lithium-Ion batteries require high-purity vanadium pentoxide.
- Stationary energy storage is expected to exceed 200GWh by 2030, of which VBs are expected to constitute 15-20%⁽³⁾.
- Vanadium contributes 30-50% of the cost of a VB⁽³⁾.
- Unique features of VB's make them ideal for utility scale, stationary energy storage applications.
- VBs are revolutionising energy storage and will become a major vanadium consumer over the next decade.
- The renewables boom has stalled without large scale storage options, creating significant demand for VBs as they are rolled out in Europe, China, Australia and the US.

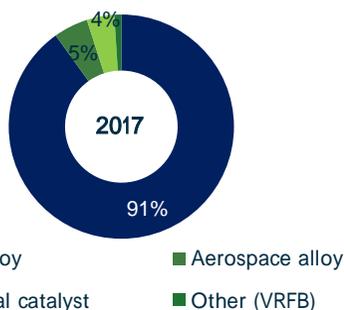
Current Demand

- Consumption of vanadium is highly concentrated amongst China, Europe and the US, accounting for ~75%⁽¹⁾.
- Nearly all demand from these regions relates to vanadium's use in steel production. Consequently, demand has historically been supported by global steel production.
- VRFBs have the potential to revolutionise energy storage and become a major vanadium consumer over the next decade, expected to constitute >20% of demand by 2030⁽²⁾.
- Demand has grown at 7.1% CAGR from 2001-14⁽¹⁾. As noted, this has been driven by the steel market. Specifically, rising global steel production and several increases to Chinese rebar strength standards (requiring additional use of vanadium).

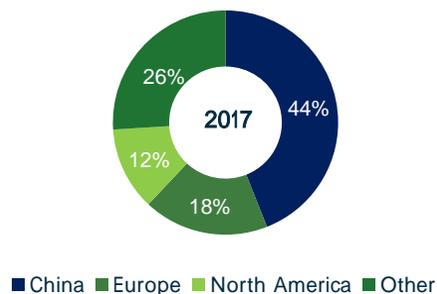
Forecast Demand

- Strong demand growth is expected to continue due to:
 - Another increase in Chinese rebar standards announced in Jan-18, expected to increase China's vanadium consumption by up to 30% (10k tonnes) per year⁽³⁾;
 - Likely increase to other emerging country steel standards to match global norms;
 - Continued global steel demand growth; and
 - The use of vanadium in VRFBs, which presents a potentially significant additional use for high purity vanadium product (sourced from ore).
- Consumption has exceeded supply in most years for the past decade. This is expected to persist until supply enters the market to satisfy growing demand across the two key end-uses.

By Use⁽¹⁾



By Region⁽¹⁾



Forecast Demand and the Supply Deficit⁽⁴⁾



Notes: (1) Largo Resources, Investor presentation, May-18. (2) Bushveld presentation 6-Jun-18. (3) Metalbulletin, 'China's vanadium consumption to surge 30% on revised rebar standards', 2017. (4) Pursuit Minerals, Road show presentation May-18.

The Future of Energy Store

Advantages of VRFB compared to Li-Ion batteries:

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



Overview

- High Purity Alumina (HPA) is purified alumina (Al_2O_3)
- 99.99% (4N) purity sells for US\$25,000 - \$40,000 per tonne
- Primarily used in LEDs and Lithium-Ion Batteries.
- The EV market is driving significant growth where HPA is used as a separator to prevent battery fires.
- 30% CAGR demand growth (unconstrained) – 272,000 tpa by 2028 (CRU HPA Outlook 2019)
- Supply deficit commencing in H2 2019

Supply and Demand

- HPA supply deficit of 20,000 tpa by 2021
- Deficit to reach 50,000 tpa by 2028
- An increased uptake in EV's (including commercial) and consumer confidence in safer car batteries will drive additional growth.
- Traditional sources of HPA are 3-4 years from production and high cost.

Target Markets

Smelter Grade Alumina	High Purity Alumina	High Purity Alumina	High Purity Alumina
SGA 99.5%	HPA 99.9% (3N)	HPA 99.99% (4N)	HPA 99.999% (5N)
US\$400 / t	US\$6,000 - \$9,000 / t	US\$25,000 - \$40,000/t	>US\$50,000 / t

AusVan Battery Target Market

Primary Uses

Electric Vehicle Batteries



- Used in lithium-ion batteries as a cathode and anode separator to decrease risk of combustion.
- Significantly growing market.

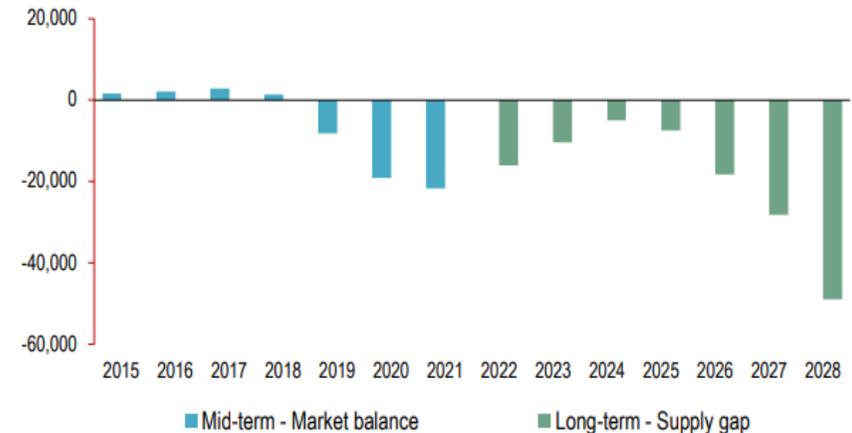
LED Lighting



- LED market growing at CAGR of 13.4% to 2024.
- Market to reach US\$15bn by 2024.

Forecast Demand and the Supply Deficit

Figure 1 CRU base case market balance and supply gap for 4N+ HPA, 2015-2028, tonnes





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