

Date: 27 Aug 2019

Ticker: AVL
Sector: Materials

CAPITAL STRUCTURE

Share Price: \$0.011
Shares on Issue (m): 1,974
Market Cap (A\$m): 21.7
Cash (A\$m): 4.4
Debt (A\$m): nil
Enterprise Value (A\$m): 17.3

BOARD AND MANAGEMENT

Brenton Lewis
Non Executive Chairman

Vincent Algar
Managing Director

Daniel Harris
Non Executive Director

Leslie Ingraham
Executive Director

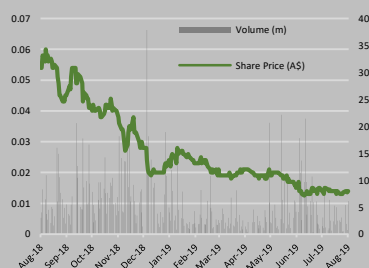
Todd Richardson
Chief Operating Officer

Neville Bassett
Company Secretary

SUBSTANTIAL SHAREHOLDERS

JP Morgan Nominees: 3.50%
HSBC Custody Nominees: 2.19%
Citicorp Nominees Pty Ltd: 2.19%
Mr Peter James Muir: 1.46%

SHARE PRICE AND VOLUME



Australian Vanadium Limited (“AVL”)

High-grade vanadium supports DFS

Key Investment Highlights

- **Unique geological attributes of the Australian Vanadium Project (“AVP” or “Project”)**, including a large high-grade vanadium resource within coarse grained high-grade massive magnetite ore, continuity and shallow oxidation of the ore deposit results in high mass recovery of vanadium to concentrate which differentiates the Project from existing global operations.
- **Robust economics at conservative long-term prices.** At AVL’s mid point PFS assumptions of US\$13.00/lb years 1-5 and US\$8.67/lb years 6-17 the AVP post-tax NPV_{8%} is US\$280m with an IRR of 19.7%. With the V₂O₅ price at its three year average of US\$11.74/lb and a current AU\$:US\$ rate of 0.67, our model generates a NPV_{10%} of A\$763m and IRR of 35.1%.
- **Low risk upside potential exists to significantly extend mine life.** The AVP is open at depth and along strike. AVL has a total strike of 11.5km of known mineralisation and an initial ~3.5km open pit strike area. A JORC-compliant Inferred Resource of 75Mt is excluded from AVL’s initial 17 year mine plan, which would potentially add + 50 years of mine life with minimal capital outlay.
- **Near-term Project enhancement and PFS optimisation opportunities** include increased mine life, increased recovery rates in vanadium roast leach extraction, reduced start-up capital costs, earlier mining of transitional and fresh ore to reduce the strip ratio and lower operating costs.
- **Favourable Project location with supporting infrastructure in place.** AVL is advancing the permitting of the AVP with no major issues identified to date. The AVP is close to road, rail, natural gas, export ports and the region has a long history of over 100 years of mining operations.
- **Vanadium market poised to benefit from favourable fundamentals.** Limited supply of primary vanadium production coupled with increased demand for vanadium in the Chinese rebar steel market due to new standards in production and the emerging energy storage application uses should be positive for V₂O₅ prices in the long-term.

Recent Company Updates

- A high-grade **vanadium-rich zone grading over 1% V₂O₅** has been identified consistently at depths below previous drilling in the planned open pit area, demonstrating that the high-grade resource is open at depth.
- These recent drilling results will be **included in a JORC-compliant resource upgrade planned for Q4 2019**, which will feed into the DFS mine plan.
- AVL has also recently conducted a **benchscale metallurgical testwork program** to optimise the process flowsheet for the AVP which is targeted at identifying improvements to the PFS economics and to support the finalised DFS design.
- Roasting at an optimised temperature and reagent conditions resulted in a **vanadium roast leach extraction of 95%**, a **substantial increase from 88%** without pelletising as applied in the PFS, resulting in upside to the DFS.

AVL is developing its 100% owned Australian Vanadium Project located in the Murchison region of Western Australia

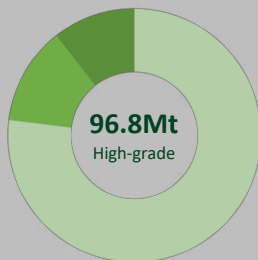
Total Resource by Grade

■ High Grade ■ Low Grade ■ Transported



High-grade Resource by Category

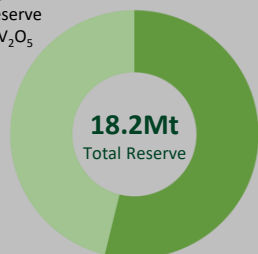
■ Measured ■ Indicated ■ Inferred



Total High-grade Reserve

■ Proved ■ Probable

Total high-grade reserve
~1.04% V₂O₅



Project Overview

- AVL owns 100% of the Australian Vanadium Project, located in the Murchison region of WA.
- The Project is located approximately 43km south of the mining town of Meekatharra, 400km north-east of the Port of Geraldton and 750km north-east of Perth. The AVP consists of 11 tenements covering approximately 260km².
- The Project is a high-grade Vanadium Titanium Magnetite (“VTM”) development asset with a completed PFS, which demonstrates the capacity for a substantial, long life and low operating cost mine.
- The AVP will produce high-purity (99.4%) V₂O₅ flake and powder product for the steel, chemical and battery markets. As outlined in the PFS, AVL will also produce cobalt, nickel and copper by-product.
- A DFS is underway on the AVP targeting completion with a view to optimising the PFS economics. A Mining Licence application has been lodged.

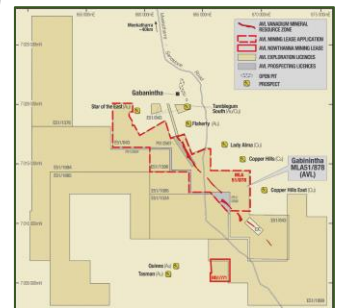
Location of the AVP



Magnified Location of AVP



AVP Tenement Package



Source: 1. Fraser Institute Annual Survey of Mining Companies 2018, AVL.

JORC Resources Table – High-grade Zone

Australian Vanadium Project - Mineral Resource Estimate at November 2018

Zone	Classification	Mt	V ₂ O ₅ %	Fe %	TiO ₂ %	SiO ₂ %	Al ₂ O ₃ %	LOI %
HG 10	Measured	10.2	1.11	42.7	12.6	10.2	8.0	3.9
	Indicated	12.1	1.05	43.8	11.9	10.6	7.6	3.5
	Inferred	74.5	0.97	42.1	11.2	11.6	7.6	3.4
	Sub-total	96.8	1.00	42.4	11.4	11.3	7.7	3.5

PFS Summary

- AVL completed a positive PFS on the AVP in December 2018 using Wood Mining and Metals consultants.
- The key highlights of the PFS are detailed below:
 - **Ore Reserve:** 18.24Mt at 1.04% V₂O₅;
 - **Concentrate production:** 900,000t pa of 1.40% V₂O₅ magnetite concentrate at an average yield of 60%;
 - **Production rate:** 22.5Mlb pa or 10,115t pa V₂O₅;
 - **Initial mine life:** 17 + years;
 - **Operating costs:** US\$4.15/lb V₂O₅;
 - **Capital costs:** US\$354m (including contingencies);
 - **NPV:** post-tax NPV_{8%} US\$125m;
 - **IRR:** 12.4%;
 - **Pricing assumptions:** conservative pricing assumptions used are a flat US\$8.67/lb for the life of mine.

Project upside

- We believe there are opportunities for AVL to deliver significant upside to the AVP projected returns as the project configuration is optimised over the course of the DFS process.
- Amongst these opportunities, the most significant are likely to be:
 1. **Reserve extension:** AVL will convert a significant proportion of its current Measured and Indicated Resource into Reserves through infill drilling for modest expenditure (circa A\$1.0m) along strike from the current planned pit.
 - Converting 20Mt into Reserve would double mine life from the PFS to 28 years.
 - An additional benefit of extensional drilling is the potential to identify transitional and fresh material which is shallower than in the current pit design, enabling the delivery of lower oxide content blend to the processing plant earlier in the production schedule.
 - Including material with a shallower oxidation horizon would also reduce the overall strip ratio and potentially reduce the capitalised mining prestrip costs of approximately A\$20m included in the PFS capex estimate.
 2. **Vanadium recovery and processing:**
 - Benchscale optimisation tests show a significant improvement in vanadium roast leach extraction. Vanadium yield in refining increased by 7% from the PFS reported rate to 95%, which would deliver overall recovery of vanadium from concentrate of circa 90%. As demonstrated in the sensitivity table overleaf, this recovery rate would materially improve project returns.
 - An alternative vanadium production route known as APV (ammonium polyvanadate) has been tested. The APV process would enable reduced reagent consumption and the potential to eliminate the desilication step required in the AMV (ammonium metavanadate) process.
 - AVL is also exploring new roasting technology to potentially reduce gas consumption by approximately 20%.

Mining at the AVP will consist of an open pit that extends for ~3,250m along strike

Drill and blast methods will be utilised which are standard for hard rock open pit mining

Mining rate peak of ~580,000 BCM/month

The pit designs contain ~23Mt of ore at an average grade of 1.03% V₂O₅ for an overall strip ratio of 6.5

The concentrator will operate 8,053 h/a and consistently generate 900,000t of magnetic concentrate per annum to feed the process plant

ROM ore is crushed, ground and concentrated to produce a magnetic concentrate of nominally 1.4% V₂O₅ and a low 1.75% SiO₂ content, which is stockpiled as filter cake prior to refining

Magnetic beneficiation yields improve as transitional and fresh ore is delivered to the plant, following the initial oxide ROM feed

The process plant is designed to operate 7,500 h/a and consistently generate 10,115 tonnes of V₂O₅ flake per annum (5,600 MTV) for sale

Eden has modelled several upside cases based on AVL's recent benchscale testwork and drilling campaigns

We have modelled conservative long-term vanadium prices under each of these upside scenarios. There is material upside to project returns from the price for V₂O₅ – our base case is priced on a flat US\$8.67/lb vs a three year average of US\$11.74/lb

The Project is highly sensitive to

- AU\$:US\$ exchange rate, due principally to the impact on revenue as the bulk of operating costs are AU\$ derived
- Forecast recovery rates, which are currently being optimised through ongoing testwork

Less sensitive to changes in capex

The AVP will operate towards the bottom of the cost curve and deliver positive cash flows even at V₂O₅ prices at the bottom of the long-term range

Project upside (continued)

3. **Coproduct sales of calcine material:** there is potential to sell the calcine waste product from the refining process as a high Ti 54% iron ore product which could attract a price that would materially improve project economics.
4. **Staged production ramp-up:** A staged production scenario may also be viable for AVL to better manage the quantum of upfront capital required to achieve first production.

Key Sensitivities

- Eden's base case modelling assumes a conservative flat input price of US\$8.67/lb for V₂O₅ product across the Project LOM and US\$:AU\$ 0.72.
- Long-term average prices for V₂O₅ 98% min China US\$/lb suggest significant upside to this pricing assumption.
- With the V₂O₅ price at its three year average of US\$11.74/lb and a current AU\$:US\$ rate of 0.67, our model generates NPV_{10%} of ~A\$763m and IRR of 35.1%.

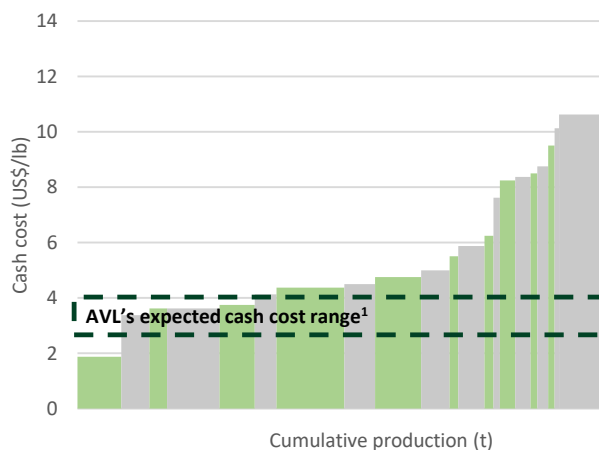
NPV \$'000		Refinery recovery					NPV \$'000		Sale price - V2O5					
		72.3%	76.3%	80.4%	84.4%	88.4%			6.94	7.80	8.67	9.54	10.40	
		(10.0%)	(5.0%)	0.0%	5.0%	10.0%			(20.0%)	(10.0%)	0.0%	10.0%	20.0%	
V2O5 concentrate grade	1.33%	(5.0%)	72,282	110,764	149,246	187,801	226,575	0.65	(10.0%)	51,340	189,842	329,322	469,348	609,363
	1.37%	(2.5%)	90,510	130,005	169,500	209,229	249,023	0.68	(5.0%)	(6,665)	124,181	255,911	388,093	521,055
	1.40%	0.0%	108,739	149,246	189,842	230,656	271,471	0.72	0.0%	(59,239)	65,165	189,842	315,374	441,278
	1.44%	2.5%	126,967	168,487	210,249	252,084	293,919	0.76	5.0%	(108,053)	12,037	130,426	249,619	369,174
	1.47%	5.0%	145,195	187,801	230,656	273,511	316,366	0.79	10.0%	(155,785)	(36,511)	76,492	189,842	303,962

IRR		Refinery recovery					IRR		Sale price - V2O5					
		72.3%	76.3%	80.4%	84.4%	88.4%			6.94	7.80	8.67	9.54	10.40	
		(10.0%)	(5.0%)	0.0%	5.0%	10.0%			(20.0%)	(10.0%)	0.0%	10.0%	20.0%	
V2O5 concentrate grade	1.33%	(5.0%)	12.5%	13.9%	15.2%	16.5%	17.7%	0.65	(10.0%)	11.8%	16.5%	21.1%	25.6%	30.2%
	1.37%	(2.5%)	13.2%	14.5%	15.8%	17.2%	18.5%	0.68	(5.0%)	9.8%	14.3%	18.7%	23.0%	27.3%
	1.40%	0.0%	13.8%	15.2%	16.5%	17.9%	19.2%	0.72	0.0%	7.8%	12.3%	16.5%	20.7%	24.7%
	1.44%	2.5%	14.4%	15.8%	17.2%	18.6%	20.0%	0.76	5.0%	6.0%	10.4%	14.5%	18.5%	22.4%
	1.47%	5.0%	15.0%	16.5%	17.9%	19.3%	20.7%	0.79	10.0%	4.3%	8.7%	12.7%	16.5%	20.3%

Source: Eden, AVL

Note: sensitivities derived by Eden's financial modelling based on discussions with AVL's management.

Vanadium Cash Cost Curve



Source: Core Consultants, Vanadium Data & Forecasts, 31 July 2019, AVL

Note: 1. Eden's assumption of reduced cash costs driven from modelled optimised cases.

- Primary producers of vanadium sit at the bottom quartile of the cost curve.
- The majority of production (72% in 2018) is as a co-product to steel slag.
- There are only three primary vanadium mines operating outside of China.
- AVL is expected to be a bottom quartile cash cost producer.

AVL's PFS opex of US\$4.15/lb V₂O₅ is in the bottom quartile, with potential to be the world's lowest cost vanadium producer

Further opex reductions are possible through the Project optimisation areas AVL is currently evaluating for incorporation into the DFS

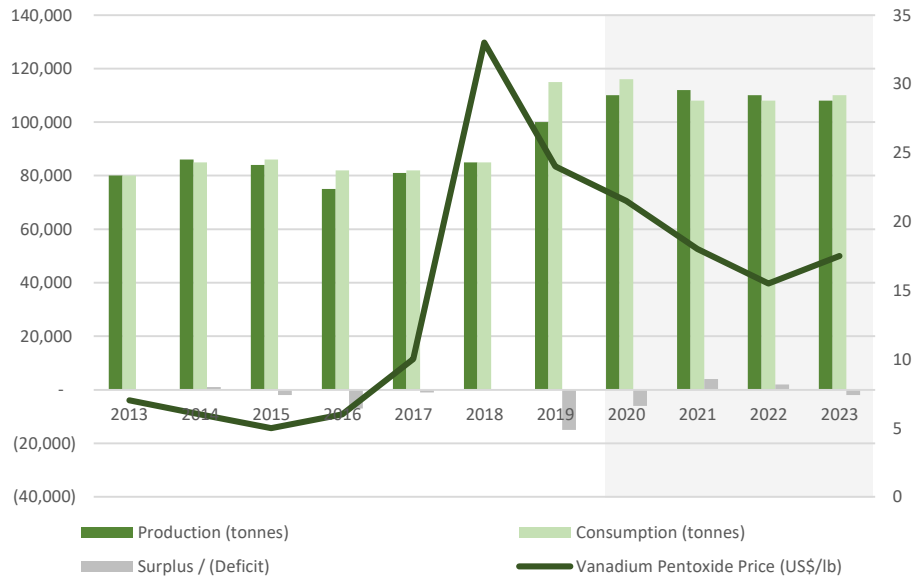
Under Eden's modelled optimised case we expect cash costs to be reduced significantly

Vanadium prices are forecast to remain high by historical standards with prices at an average of ~US\$18.0/lb

Structural deficit forecast for the vanadium market

AVL has several catalysts, in addition to a recovery in the V₂O₅ price, to promote a recovery in its share price

Vanadium Market Outlook



Source: Core Consultants, Vanadium Data & Forecasts, 31 July 2019.

- The vanadium pentoxide price has declined from its peak in 2018, however prices are forecast to remain high by historical standards with prices at an average of ~US\$18.0/lb.
- Robust and a growing demand from the steel sector coupled with significant upside from energy storage applications and constrained and limited supply is expected to lead to a sustained structural deficit in the vanadium market.

Next Steps

- Recent drill results will be included in a Resource upgrade planned for Q4 2019, which is likely to deliver a significant conversion of current Resource tonnes into Reserves.
- Program focused on development area in northern 2km of total 11.5km of AVL held deposit strike illustrating further near-term upside potential.
- Pilot scale metallurgical test program underway to confirm details of processing circuit for final DFS design.
- Hydrology drilling, DFS engineering and environmental approval support work is ongoing.
- Financing discussions and strategic agreements are progressing.

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