

# Australian Vanadium Ltd

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## Australian Vanadium prepares to submit final Gabanintha vanadium PFS

Australian Vanadium Ltd (ASX:AVL) is finalising a pre-feasibility study (PFS) for the Gabanintha Vanadium Project in Western Australia this month ahead of producing a definitive feasibility study (DFS) next year with the help of Wood plc.

Last month the company updated the resource for the Mid West region project, reporting 183.6 million tonnes grading 0.76% vanadium pentoxide.

The resource is 50 kilometres from the town of Meekatharra along Meekatharra Road and includes a massive magnetite zone which features 96.7 million tonnes grading 1% vanadium.

Explorers drilled 1,863 metres at Australian Vanadium's flagship project in 2018, drilling a consistent 3-10 metre-thick zone grading more than 1.2% vanadium pentoxide in 10 of 11 holes.

The massive magnetite layer averages 14 metres in thickness.

Besides vanadium, the Gabanintha project also features titanium and iron, as well as cobalt, copper and nickel in sulphide minerals.

Zone	Classification	Mt	V <sub>2</sub> O <sub>5</sub> %	Fe %	TiO <sub>2</sub> %	SiO <sub>2</sub> %	Al <sub>2</sub> O <sub>3</sub> %	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
	<b>Sub-total</b>	<b>96.7</b>	<b>1.00</b>	<b>42.4</b>	<b>11.4</b>	<b>11.3</b>	<b>7.7</b>	<b>3.5</b>
LG 2-5	Measured	-	-	-	-	-	-	-
	Indicated	28.6	0.50	24.6	6.9	27.5	17.9	8.6
	Inferred	53.9	0.49	25.3	6.7	27.5	16.4	7.3
	<b>Sub-total</b>	<b>82.5</b>	<b>0.49</b>	<b>25.1</b>	<b>6.8</b>	<b>27.5</b>	<b>16.9</b>	<b>7.7</b>
Transported 6-8	Measured	-	-	-	-	-	-	-
	Indicated	-	-	-	-	-	-	-
	Inferred	4.4	0.65	28.2	7.2	24.7	16.7	8.5
	<b>Sub-total</b>	<b>4.4</b>	<b>0.65</b>	<b>28.2</b>	<b>7.2</b>	<b>24.7</b>	<b>16.7</b>	<b>8.5</b>
Total	Measured	10.2	1.11	42.7	12.6	10.2	8.0	3.9
	Indicated	40.7	0.66	30.3	8.3	22.5	14.8	7.1
	Inferred	132.7	0.77	34.8	9.2	18.5	11.5	5.1
	<b>Sub-total</b>	<b>183.6</b>	<b>0.76</b>	<b>34.3</b>	<b>9.2</b>	<b>18.9</b>	<b>12.1</b>	<b>5.5</b>

'Robust' baseline PFS underpins final study

Australian Vanadium published a 'robust' base case for its PFS for Gabanintha project in September 2018, saying the project had strong fundamentals that supported the detailed optimisation work it was undertaking for the detailed study.

The baseline PFS indicated the company had the potential to become a low-cost vanadium producer in the international

**Price:** 0.012

**Market Cap:** \$30.63 m

### 1 Year Share Price Graph



February 2019 August 2019 February 2020

### Share Information

**Code:** AVL

**Listing:** ASX

**52 week High Low**  
0.026 0.009

**Sector:** Exploration & Production

**Website:** www.australianvanadium.com.au

### Company Synopsis:

Australian Vanadium Ltd (ASX:AVL) is focussed on The Australian Vanadium Project, near Meekatharra in Western Australia. The Australian Vanadium Project is a high-grade Vanadium Titanium Magnetite (VTM) deposit and is one of the highest-grade vanadium projects currently being developed in the world.

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marketplace.

Australian Vanadium managing director Vincent Algar told Proactive Investors this week the company remained on track to present the final PFS to its board this month.

Geologist Algar also confirmed the company was planning to produce a DFS for the project next year, with the same contractor it had been working on for the PFS, the Wood group.

The MD said Australian Vanadium expected to name which quarter it would deliver the DFS in after taking the final PFS to its board.

### **READ: Australian Vanadium boosts vanadium resource, further derisking project**

Australian Vanadium included a number of net present value figures (NPV8) in its preliminary study which were calculated at an 8% discount and modelled on an initial open-pit mine life of 17 years.

The highest NPV8 figure was up to US\$2.37 billion and used a ceiling vanadium price of US\$20 a pound, with a corresponding internal rate of return (IRR) of 69.8% and operating expenses (opex) of US\$4.28 a pound or US\$4.13 a pound when calculated as a vanadium equivalent.

Another base case for the PFS was based on a US\$8/pound vanadium price and had an NPV8 of US\$191 million at with a 14.5% IRR.

Like the US\$20 a pound calculation, opex was US\$4.28 a pound or US\$4.13 a pound vanadium equivalent.

Regulatory change in China puts pressure on price

Vanadium is trading for about US\$29 a pound, changing hands for US\$29.10 a pound in China and US\$28.75 a pound in Europe.

The price is being pushed up by a predicted 10,000 tonne, or 30%, increase in demand for vanadium out of China due to regulatory change in the country where steelmakers were to better reinforce their steels with vanadium from November 1, 2018, to make the steels stronger.

### **READ: Australian Vanadium offers vanadium expertise to battery industry research centre**

Corresponding stricter environmental standards in the Asian country also mean manufacturers are barred from sourcing acid-leached vanadium from the country's usual go-to source for vanadium in times of short supply — small producers that use stone-coal processing, and leach vanadium from stone coal using acid.

China's use of tighter environmental standards amid greater demand means producers are looking farther afield, with their hunt having an upwards effect on price.

'Well viable' target

Geologist-MD Algar told Proactive Investors the company's operating costs for Gabanintha project were important to the team which was aiming to be 'well viable' at a US\$8 a pound vanadium oxide price.

Algar, who is also a contributing member of the vanadium industry body Vanitec, said, "At the moment we're sitting in a regime where the price is around US\$30 — that's an all-time high, so we don't want to be living there.

"One of the scenarios we put forward in the base case was US\$13 (a pound) for the first five years, and then US\$8 (a pound) for the next five years ... till the end of the mine life thereafter. And that gave us an NPV base of about US\$575 million dollars with an IRR of 33.6%."

Like the three other base cases modelled, the scenario also assumed opex was US\$4.28 a pound or US\$4.13 a pound vanadium equivalent.

The base case life-of-mine (LoM) price estimate was US\$13 a pound, meaning the base case NPV8 of US\$1.1 billion had a 39.5% IRR.

Algar acknowledged some people preferred NPVs to be calculated with a 10% discount (NPV10s), saying NPV8 and NPV10 figures were likely to be presented in the final PFS.

He said Australian Vanadium believed opex cost was the most important part of the equation, as the bottom of the cost curve for vanadium production was about US\$4 a pound, with many producers sitting in the US\$4 to US\$6 a pound range.

The bottom price for vanadium sales was about US\$2.25 a pound, seen at the beginning of 2016, with the price gaining more than 10 times over since the start of 2017 when the price was about US\$3.50 a pound.

With the structural market-changes to supply and demand, the future price of vanadium is unlikely to reach these lows again.

#### Comparison to peers

Vanadium is an in-demand critical mineral on the US Government's Final List of Critical Minerals 2018, published in May 2018.

The weather-resistant alloy helps improve tensile strength of steel and alloys, and supports fuel efficiency in the automotive and aerospace industries with its high strength-to-weight ratio.

Vanadium also allows for large-scale energy storage when used in vanadium redox-flow batteries (VRFBs).

About 85% of the world's production comes from magnetite deposits found in South Africa, Russia and China, with supply from the three countries trending down from 98% in June 2001.

About 91% of world demand for vanadium comes from the steel industry, but so-called energy industry disruptors are expected to push the figure down to 70% as the energy storage business takes off.

#vanadium made the list of US #criticalminerals — how many can WA supply? @westaustralian @BillJohnstonMLA #mining <https://t.co/oy02BS6XQm>

— Australian Vanadium (@AusVanadium) May 19, 2018 **BIG PICTURE: The recent stellar growth from Bushveld Minerals may just be a harbinger of things to come**

Australian Vanadium's Gabanintha project has been compared to the large layered intrusion known as the Bushveld complex in South Africa.

The complex has been estimated to host more than half of the world's vanadium, platinum, chromium and refractory minerals.

Australian Vanadium described its Gabanintha resource as a 'Bushveld complex-sized area'.

The Gabanintha deposit has been outlined over more than 11 kilometres of drilled strike length, in area with good access to infrastructure.

MD @VincentAlgar & our exploration manager are attending @CSIROnews workshop 'Magmatic ore deposits and battery metals' in Perth today, featuring experts from @WitsUniversity talking about @BushveldMin\_Ltd Bushveld complex #vanadium [pic.twitter.com/AuUvLqGNFn](https://pic.twitter.com/AuUvLqGNFn)

— Australian Vanadium (@AusVanadium) November 30, 2018

The company acknowledges it will be compared to three key players in the vanadium business that sit at the bottom of the cost curve, producing vanadium pentoxide in the range of US\$1 to US\$4.50 a pound.

London-headquartered Evraz plc (LON:EVR) (FRA:EVZ) (OTCMKTS:EVRZF) is the cost king, able to produce on the lowest end of the cost curve.

The company has the Evraz Highveld Steel and Vanadium Corporation Ltd in South Africa and its Evraz Vanady-Tula vanadium pentoxide business in Russia.

Vanady-Tula is the largest producer in Europe.

The Evraz group's Czech Republic business Evraz Nikom produces ferrovanadium from Vanady-Tula's vanadium pentoxide to ship to steelmakers across the globe.

**READ: Bushveld Minerals pushes ahead with Vametco expansion as vanadium prices rise again**

AIM-listed vertically-integrated vanadium producer Bushveld Minerals Ltd (LON:BMN) (FRA:23U) (OTCMKTS:BSHVF) is able to come in at the US\$3.50 mark, like its peer Largo Resources Ltd (TSE:LGO) (FRA:LR81) (OTCMKTS:LGORF).

Parent company Bushveld's subsidiary Bushveld Vanadium produces low-cost vanadium and is also focused on the additional, vertical market of VRFB technologies.

Subsidiary Bushveld Energy meanwhile has ambitions to be both a VRFB energy storage project developer and component manufacturer.

Largo has the Maracas Menchen vanadium mine in Brazil.

South African producers meanwhile can produce vanadium pentoxide at a cost of about US\$4.50 a pound.

Other players in the mix are Glencore PLC (LON:GLEN) (JSE:GLN) (OTCMKTS:GLCNF) (OTCMKTS:GLNCY) and Australian-listed juniors such as October 2018 debutante QEM Ltd (ASX:QEM) which has the Julia Creek Oil-Shale and Vanadium Project and Tando Resources Ltd (ASX:TNO) with its SPD Vanadium Project.

READ: Tando Resources intersects mineralisation in all holes at SPD Vanadium Project  
Australian Vanadium's managing director told Proactive the company's aim was to produce vanadium pentoxide at a cost per pound of between US\$1 and US\$4.50.

He said, "Our target is to be in that range as a producing vanadium mine.

"Now, there are not many of those in the world and this is the most important thing that people must remember.

"The rest of the cost curve is made up by Chinese steel producers producing vanadium from slag, and they've got a marginal cost of production between US\$4 and US\$7.

"So we really have to target ourselves at the bottom of the cost curve, because we have to ride out those cycles over time."

Resource Update at Gabanintha Vanadium Deposit Increases Indicated Mineral Resource. MD @VincentAlgar commented '...modifications to the #vanadium resource increased the size, added confidence and further reduced risk to the Gabanintha project.' \$AVL <https://t.co/DXrhojngt3> [pic.twitter.com/S2cFjOfXDj](https://pic.twitter.com/S2cFjOfXDj)

— Australian Vanadium (@AusVanadium) November 28, 2018 Capital structure

Like most corporate leaders Algar has a stake in his company's success, as an Australian Vanadium shareholder.

Australian Vanadium's top 20% shareholders had 24.64% of the company on November 28, 2018, while the remaining shareholders had 75.36%.

JP Morgan Nominees Australia Limited was the top shareholder with 52.9 million shares (a 3.11% stake), while second-largest investor HSBC Custody Nominees (Australia) Limited had 40.7 million shares (2.39%) and third-largest shareholder Citicorp Nominees Pty Ltd had 38.7 million shares (2.27%).

Visited one of the worlds biggest #vanadium producers. Can now fully understand the scale \$AVL is aiming for & why it requires such detailed preparation. Amazing insight into the production side. Can only say it was an awesome experience. [pic.twitter.com/6f3w6oZpkd](https://pic.twitter.com/6f3w6oZpkd)

— Mastermines (@VanadiumWorld) November 24, 2018 De-risking builds mine life

While Australian Vanadium's baseline PFS imagines a 17-year mine life, an expected life of more than 20 years is not out of the question.

Efforts to de-risk the project, such as the recent conversion of 70% of inferred resources to indicated resources, may help to extend its mine life.

Geologist Algar said, "I'm very confident of the resource, and as I do that, I'll bring more and more (resources) into the mine life, making the mine life longer.

"Our target is to push that mine life out to 20, 25, 30 years."

### **READ: Australian Vanadium confirms broad high-grade vanadium zone at Gabanintha**

De-risking takes commitment.

Algar said, "Our objective is to de-risk (Gabanintha) to the point where it's very investible, and it can then become the next vanadium project.

"We're not going to forgo risk reduction for speed.

"Some people might assume that means I want to go slowly, (but) that's not at all the case — I'm just saying we must do good work."

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