

ASX Announcement

NeXTek 2016 Presentation

Australian Vanadium Limited (ASX: AVL, “the Company” or “AVL”) is pleased to provide a copy of Managing Director, Vincent Algar’s presentation, which will be given at the NeXTek 2016 Conference in Perth today.

AVL is a vanadium focused company advancing the Gabanintha vanadium deposit in Western Australia and leveraging opportunities within the emerging battery storage market.

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ASX ANNOUNCEMENT

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Gabanintha Gold, Copper





Australian
VANADIUM
LIMITED

Innovating from the Resource Upwards

NeXTek Conference Perth 2016

Vincent Algar

Managing Director

Disclaimer

The views expressed in this presentation contain information derived from publicly available sources that have not been independently verified. No representation or warranty is made as to the accuracy, completeness or reliability of the information.

Comment

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Competent Person Statement – Mineral Resource Estimation

“The information relating to the Gabanintha Mineral Resource estimate was compiled by Mr John Tyrrell. Mr Tyrrell is a Member of the Australian Institute of Mining and Metallurgy (AusIMM) and a full time employee of AMC (Australian Mining Consultants Pty Ltd). Mr Tyrrell has more than 25 years’ experience in the field of Mineral Resource Estimation. He has sufficient experience relevant to the style of mineralisation and type of deposit under consideration and in resource model development to qualify as a Competent Person as defined in the 2012 JORC Code.

Mr. Tyrrell consents to the inclusion in the report of the matters based on the information made available to him, in the form and context in which it appears”.

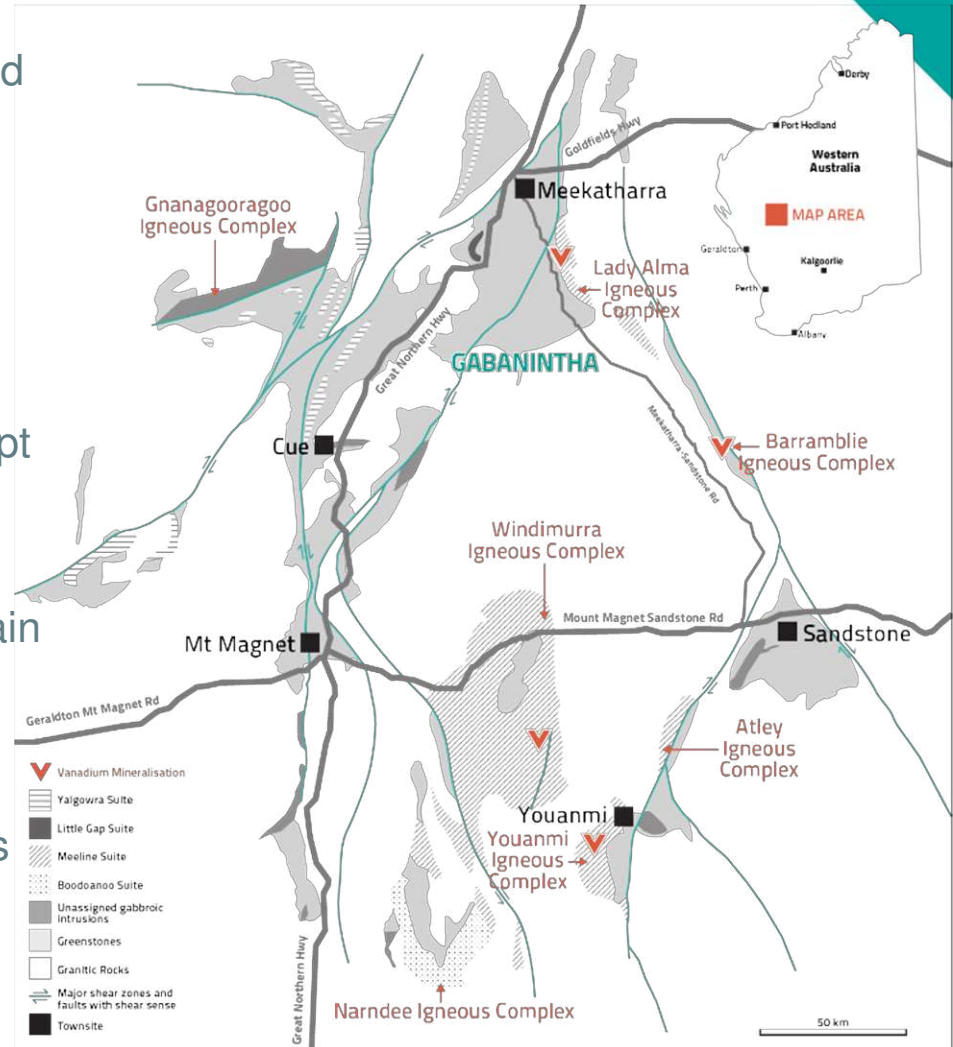
Forward Looking Statements

No representation or warranty is made as to the accuracy, completeness or reliability of the information contained in this release. Any forward looking statements in this presentation are prepared on the basis of a number of assumptions which may prove to be incorrect and the current intention, plans, expectations and beliefs about future events are subject to risks, uncertainties and other factors, many of which are outside Australian Vanadium Limited’s control. Important factors that could cause actual results to differ materially from the assumptions or expectations expressed or implied in this presentation include known and unknown risks. Because actual results could differ materially to the assumptions made and Australian Vanadium Limited’s current intention, plans, expectations and beliefs about the future, you are urged to view all forward looking statements contained in this release with caution. The release should not be relied upon as a recommendation or forecast by Australian Vanadium Limited. Nothing in this presentation should be construed as either an offer to sell or a solicitation of an offer to buy or sell shares in any jurisdiction.



Overview

- AVL is a renewable energy metal focused ASX listed company
- Significant vanadium project with large, high-grade Measured, Indicated and Inferred resources at Gabanintha, Western Australia
- Believe energy storage market will disrupt global renewable energy metal supply
- Integrated strategy to add value throughout the energy storage value chain
- Key agreements in place to ensure funding and delivery of strategy
- Innovation and research across all areas to maximise early mover and cost reduction advantages



Corporate Snapshot

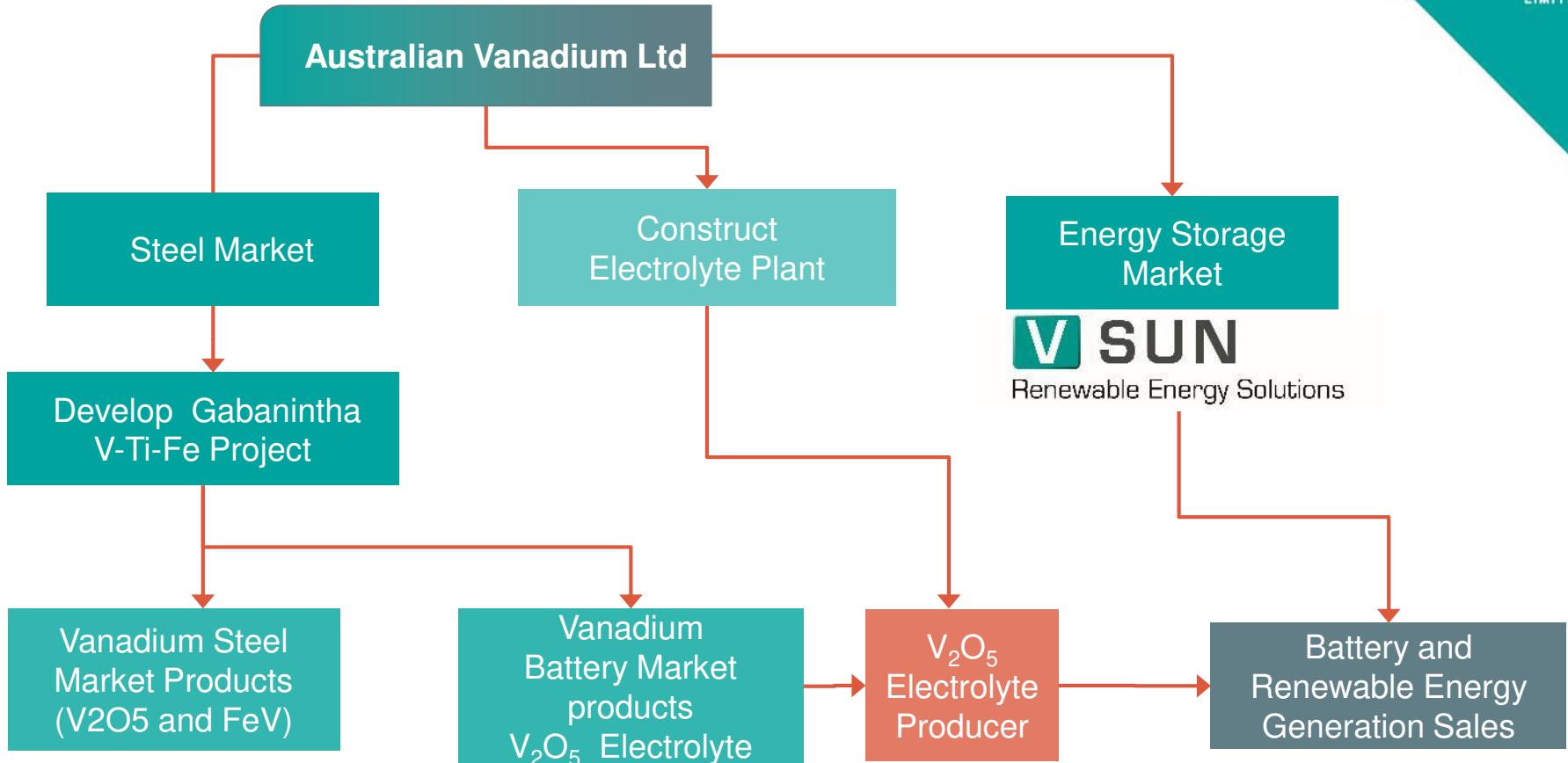
Capital structure and major shareholders

Key Statistics (as at 15/7/16)	
Ordinary shares on issue	1002.1m
Options on issue (ex at 1.47c expire Dec 2017)	258.3m
Listed Options (ex at 2.c exp Dec 2018) AVLO	235.8m
Share price	AUD \$0.013
Market capitalisation (undiluted)	\$13m (Cash ~\$3.1m)
Shareholders	2,165
Substantial Shareholders	
	% holding
Mr Neale Parsons	4 %
Management	7 %
Board of Directors	
	Title
Brenton Lewis MBSc., BBSc.(Hons)	Non Executive Chairman
Vincent Algar BSc(Hons) Geol, MAusImm	Managing Director
Leslie Ingraham	Executive Director

AVL Share Price History



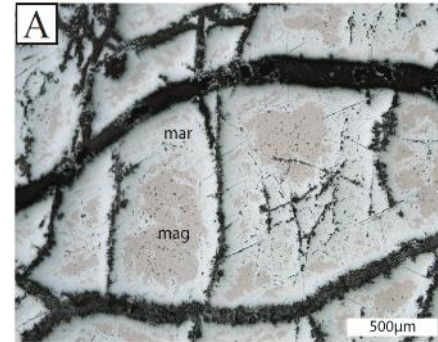
AVL Vertical Integration Strategy



Innovation Overview

Project Innovation

- Drilling management
- Detailed mineralogy
- Density analysis (current being completed)



Process Innovation

- Review of non-standard processing option
- Inclusion of new product streams at mine site location (Electrolyte quality purification)
- Electrolyte production
- Renewable Power Options such as PV and concentrated Solar Energy
- Job Creation – Graduate Chemical Engineer employed
- R&D Grant process is an excellent incentive to innovate with up to 45% recovery of costs



Finished Product Sales

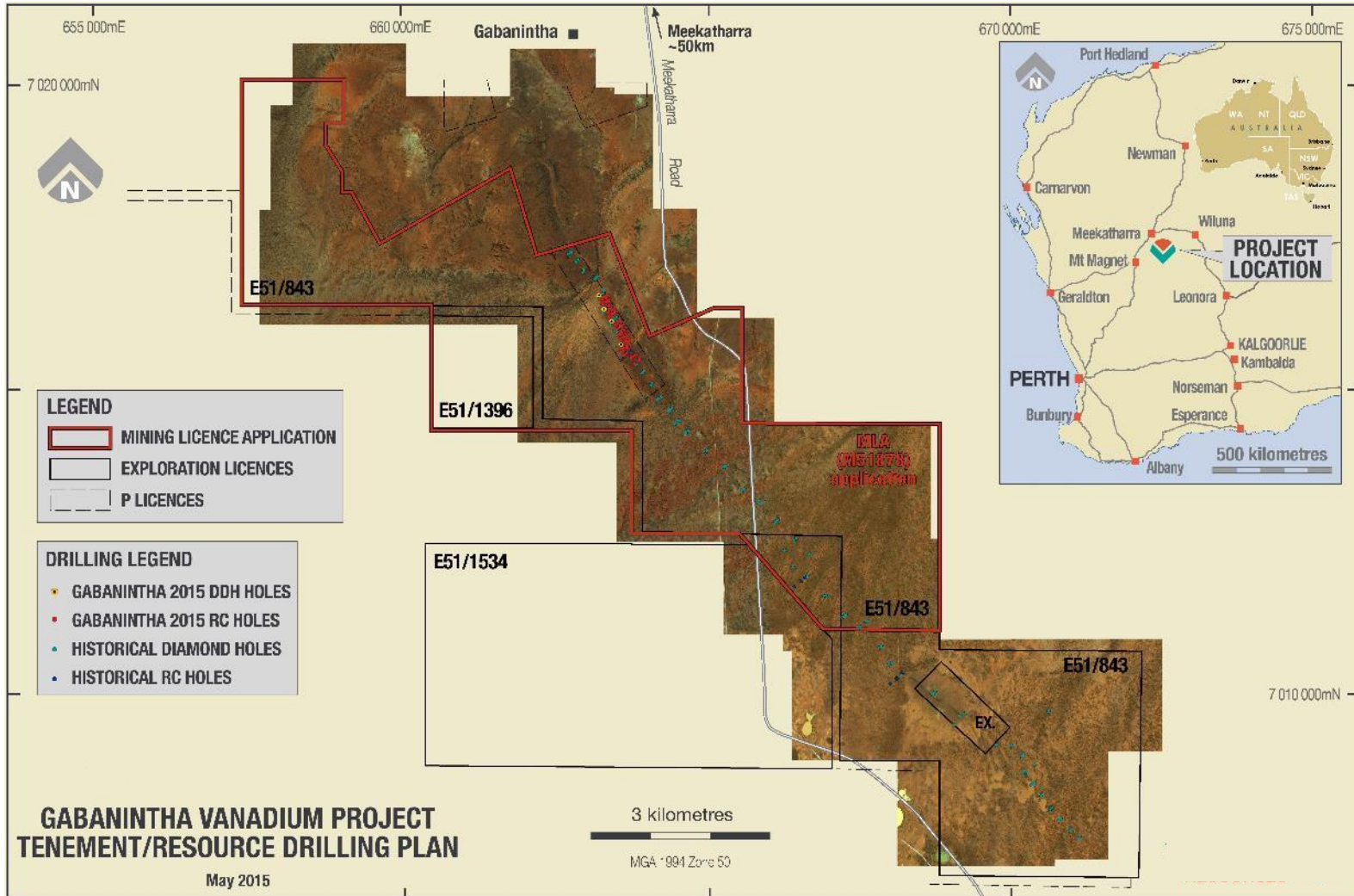
- Agreement with Battery Makers
- Offtake Agreements and relationships



Globally Significant Project

Gabanintha Vanadium Project

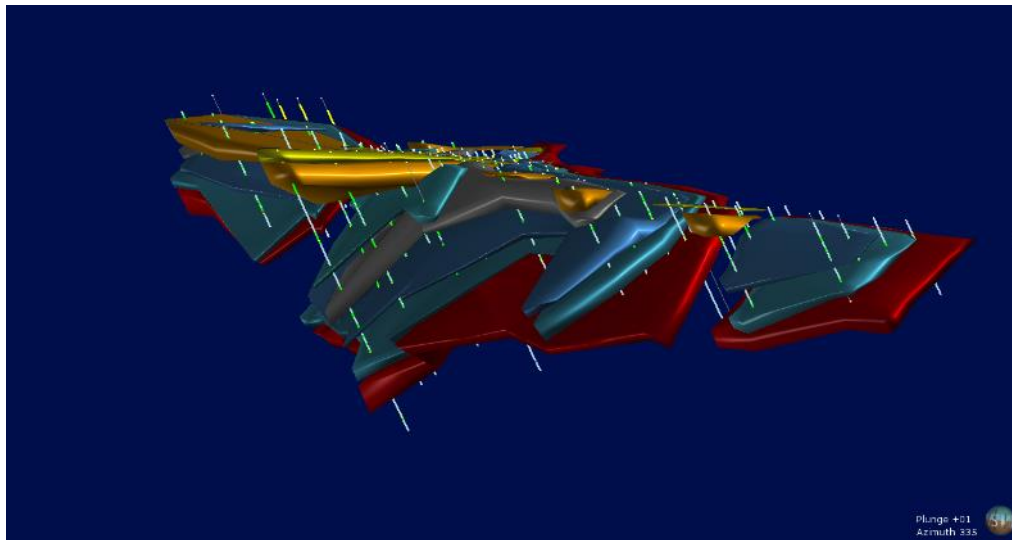
Excellent project location and significant additional resource potential



Gabanintha Vanadium Project

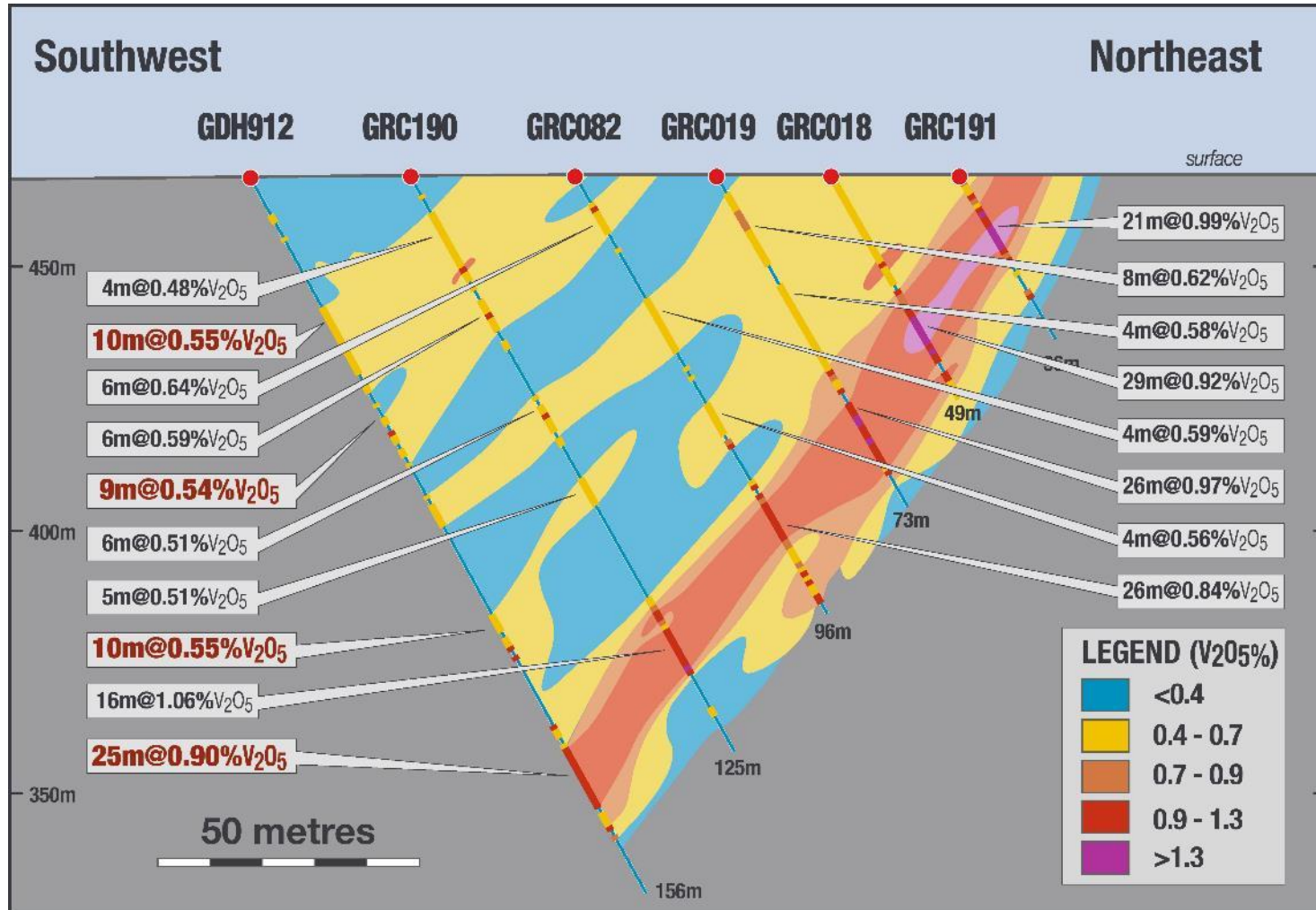
High grade resource in favourable mining jurisdiction in Murchison of WA

- One of the highest-grade vanadium deposits currently being advanced globally;
- JORC 2012 compliant total resource of 91.4Mt @ 0.82% V₂O₅, 10% TiO₂ and 35% Fe
- Separate high-grade Measured Indicated & Inferred Resource of 56.8Mt @ 1.0% V₂O₅, 11% TiO₂ and 42% Fe
- Deposit is at surface suitable for open pit operation and open at depth



Gabanintha Vanadium Project

Discrete high-grade zone, simple geometry, suitable for open pit mining



Vanadium Resource

Large high-grade resource

Material	JORC Resource Class	Million Tonnes	In situ bulk density	V ₂ O ₅ %	Fe%	TiO ₂ %	SiO ₂ %	Al ₂ O ₃ %	LOI%
High grade	Measured	7	3.73	1.09	43	12	10	8	3.4
	Indicated	4.3	3.29	1.07	41	12	12	9	4.6
	Inferred	45.5	3.67	0.97	42	11	12	8	2.8
Subtotal High Grade		56.8	3.65	1.0	42	11	12	8	3.0
Low grade	Indicated	13.4	2.39	0.55	24	7	27	19	8.7
	Inferred	21.1	2.48	0.53	25	7	27	17	7
Subtotal Low grade		34.6	2.45	0.53	25	7	27	18	7.6
Subtotal Measured	Measured	7.0	3.73	1.09	43	12	10	8	3.4
Subtotal Indicated	Indicated	17.8	2.61	0.68	28	8	23	16	7.7
Subtotal inferred	Inferred	66.7	3.29	0.83	37	10	17	11	4.1
	TOTAL	91.4	3.19	0.82	35	10	18	11	4.8

Note: density values quoted here are weighted average values. The Mineral Resource was estimated as a block model within constraining wireframes based upon logged geological boundaries and grade cut-offs of 0.30% V₂O₅ for Low Grade (LG) and 0.70% V₂O₅ for High Grade (HG). Tonnages have been rounded to reflect that this is an estimate.

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Project Innovation

Work at Project level to improve outcomes during drilling, resource

- Drilling management – use of satellite internet, daily reporting and logging status reporting.
- Detailed mineralogy study with UWA CET including polished and thin sections, oxidation studies and using SEM, X-Ray Spectrometry.
- Mineralogy work essential precursor to metallurgical and mining studies
- Mineralisation and oxidation based density sampling across the mineralisation
- Characterisation of Bulk Density vs True Density relationships by material and weathering state. Essential to understand porosity as a function of weathering
- Detailed review of non-standard mineral processing methods. For Vanadium these are mainly hydrometallurgical and reduction methods of processing to extract vanadium
- Review of processing plant power options – focusing on maximizing renewable energy generation.



Processing Plant Power Options

Large Scale Solar PV and Concentrated Solar as options for Gas replacement

- Gas pipeline access essential for large scale mining projects to keep power costs down. Gas pipelines are expensive to build, maintain and contracts are very long term
- Gas is ideal for production of electricity AND process heat.
- Diesel only alternative power is expensive and volatile
- Large scale PV can provide large proportion of daytime requirements for electricity. (Sandfire Resources 10MW PV)
- Battery Storage can alleviate transitions when sun is not available
- CSP (Concentrated Solar Power) is ideal source of process heat and conversion of heat to electricity.
- Solar fuel enrichment (production of syngas from concentrated fuel source), can further reduce amount and cost of refined fuels needed to balance heating
- CSP and Solar Fuel enrichment currently receiving strong attention from ARENA.
- Gabanintha processing route offers an ideal opportunity for unique renewable energy processing power innovation.



Concentrated Solar Energy Tower with parabolic concentrating mirrors



Vanadium Markets

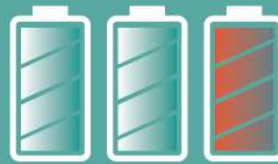
Energy Storage

Vanadium in Energy Storage

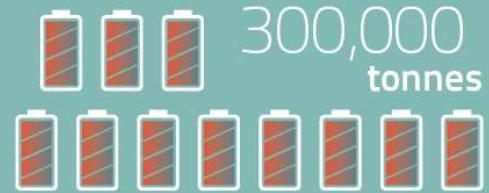
“Energy storage has the potential to transform our entire energy system.”– Clean Energy Australia



Battery storage capacity expected to grow to 185 Gwh in the next few years



62 Gwh (30%) of this market demand expected to be taken up by Vanadium Redox Batteries



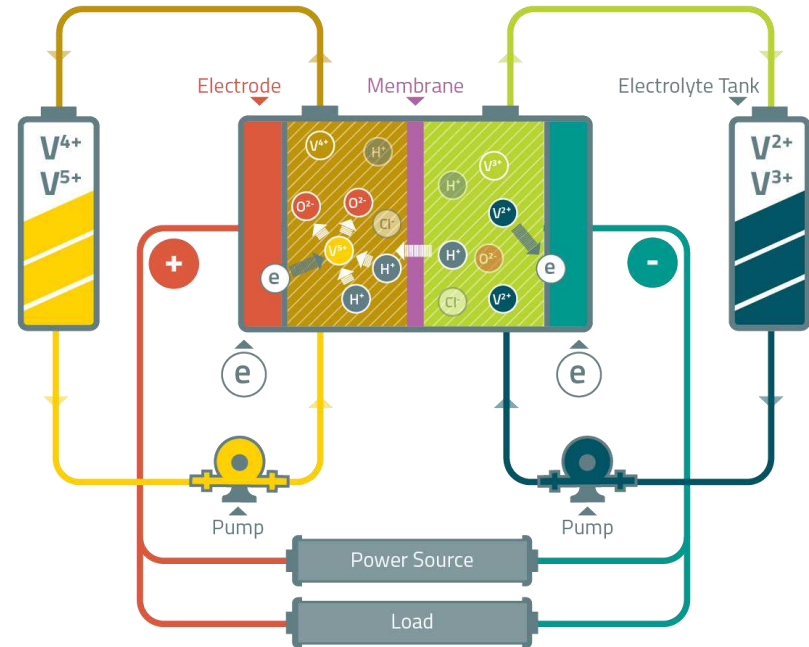
Results in 300,000 tonnes of new demand for vanadium

 **SUN**
Renewable Energy Solutions

Vanadium in Energy Storage

Unique characteristics of Vanadium Redox Batteries (VRBs)

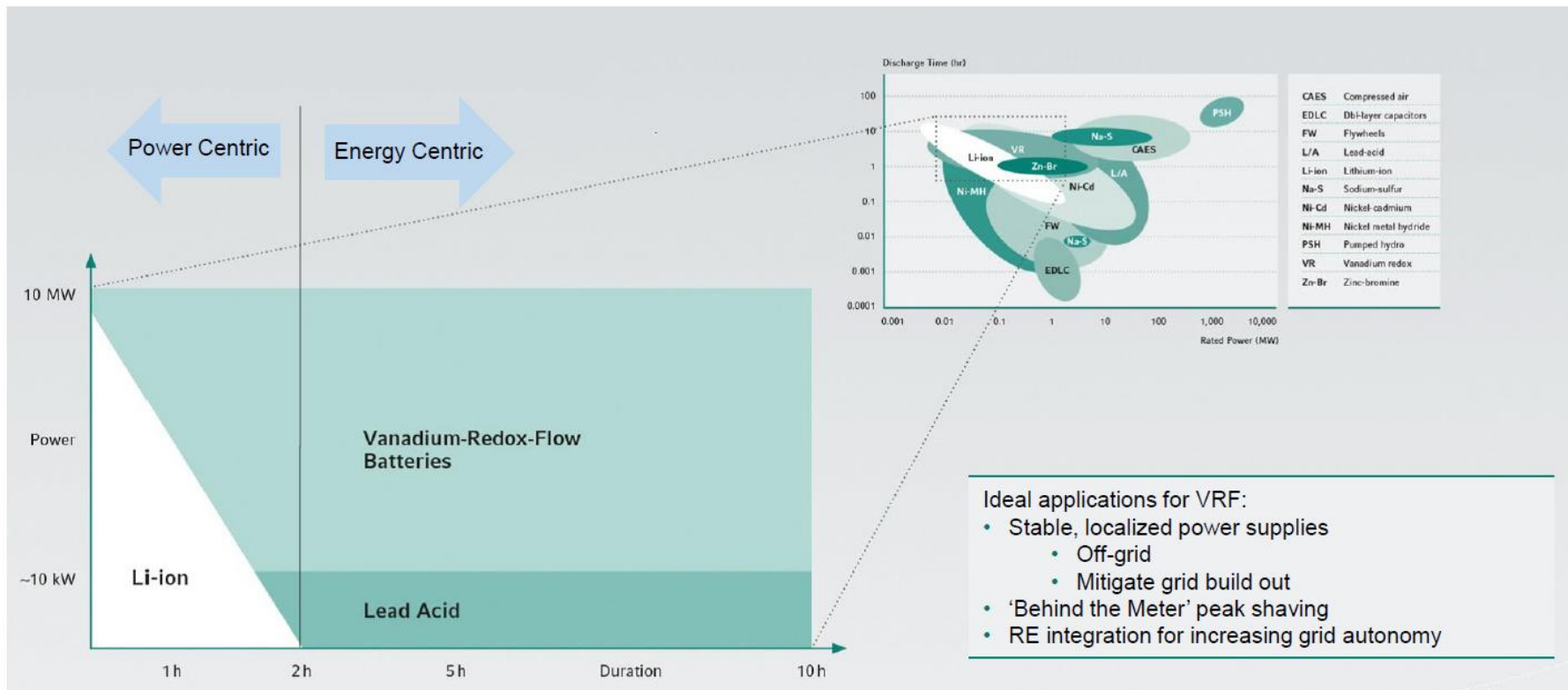
- Flow Battery Technology well established and at commercial deployment status
- VRBs provide a way to store and re-supply renewable energy. Their very high capacity is ideal for large-scale energy storage applications, unlocking the full potential of renewables while maintaining grid security.
- VRBs have unique advantages over other batteries;
 - Easily scaled into large MW scale solutions
 - Lifespan of 20 years with very high cycle life and no capacity loss over time
 - A key feature of using only one element in electrolyte, V_2O_5 which can be re-cycled
 - Immediate and rapid energy release
 - Excellent charge retention (up to 1 year)
 - Suitable for grid connection
 - Can discharge 100% with no damage
 - Improved safety and low replacement rate compared to Li-ion (Lower lifetime LCOE)



Vanadium in Energy Storage

Battery technology—Defining the space for flow battery technology

Vanadium Flow Batteries are Energy Batteries that provide a unique ability to significantly time-shift very large amounts of previously generated energy.



Source: GILDEMEISTER Energy Storage

Vanadium vs Lithium : Key Comparisons

Vanadium Flow Battery	Lithium (Li-ion)
Energy Battery – store large amounts of energy for later use	Power Battery – ideal for shorter term high power application
Energy stored in Electrolyte Tanks	All energy stored in cell
Stable – non-flammable	Flammable (prone to thermal runaway)
Long lifespan (20 years) due to very high cycle life. No degradation during cycling. (20,000 cycles)	Short lifespan (5-10 years) due to physical changes induced in charge discharge cycle (6000 cycles)
Vanadium Electrolyte can be re-used, does not degrade (30% residual value)	Recycling difficult due to multiple components (no residual value)
Scalability – as modules or by introduction of larger tanks – fewer control systems	Multiple small batteries required – Complexity of control increases
100% depth of discharge with no lifetime capacity loss	Limited to 80% depth but with increasing capacity loss in high cycle environment

Redox Battery Market Beckons in Australia

Can the VRB be the ultimate grid energy storage solution for Australia?

- Rising power costs: VRB can reduce power bills by peak off-peak shifting and demand management
- Australia has world's most extended networks: many fringe-of-grid and off-grid opportunities exist
- Battery storage strongly on political agenda: efforts to reduce power price rises and carbon dependency
- VRB rollout can assist with Australian networks' primary goal – capital cost deferment
- Australian storage market expected to grow to 3000MWh by 2030.
- VSUN actively identifying multiple large (+10kW to 200kW) commercial storage opportunities.



V SUN
Renewable Energy Solutions

Key Partnerships in Place to Grow Strategy

AVL is on track to achieving vanadium storage market objectives with excellent market and technology companies



- GILDEMEISTER energy storage GmbH developed the CellCube, the world's most commercially advanced Vanadium Flow Battery, based on 15 years of development with over 100 installations worldwide.
- MOU is in place for future co-operation in developing the Australian vanadium flow battery market .
- Signed Distribution Agreement for distribution of CellCube energy storage systems.

- Sun Connect is an Australia-wide commercial solar solution company, an appropriate partner for AVL in the installation of integrated solar and VRB solutions.
- MOU is in place to collaborate on VRB opportunities with installations throughout Australia.
- AVL and Sun Connect are actively evaluating several potential integrated solar and VRB installations throughout Australia.

- C-Tech Innovation is a UK research and technology company supplying technology for electrochemical applications
- MOU is in place to collaborate on VRB opportunities with installations throughout Australia.
- AVL and C-Tech will collaborate on building Vanadium Electrolyte plant capacity in Australia
- C-Tech will assist in the integration of electrolyte production capacity into the Gabanintha Project design.



Local Value Addition in V-electrolyte

Vanadium Electrolyte Production at the source de-risks and adds options

- » Vanadium Electrolyte is battery “fuel”
- » Mild acid solution of V_2O_5 with all oxidation states available for electron transfer.
- » Can be produced in stand-alone plant or as part of mine process.
- » Offers unique opportunity to value-add at source location for low cost
- » Local production leads to all-important reduction of battery TCO
- » Benefits target market by having local “supply” for imported battery units.
- » Long life product in cells mean low replacement requirement (20 years)
- » High re-cycle potential for Vanadium units
- » Company advancing to stand alone plant specification and development in 2016

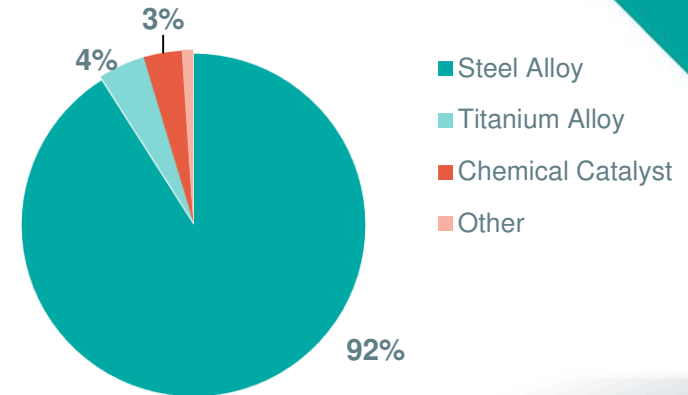


Vanadium Markets *Steel*

Vanadium Markets - Steel

Despite reduced rate of steel production, demand for vanadium continues to grow. Steel remains a price driver for vanadium

- Steel is primary market (92% of vanadium consumption)
- Addition of 0.2% vanadium increases steel strength up to 100% and reduces weight up to 30%
- Demand for use in rebar continues to increase at 6% annually (TTP Squared)
- New markets in steel will increase demand such as;
 - Materials for automotive, aviation and aerospace
 - Power lines and power pylons
 - High-strength steel structures
- Upward price signals in 2016 are clear from very recent data (RN and BM via TTP Squared analysis)
- Rising prices have immediate improvement of Gabanintha Project economics due to its higher resource grades



Australian Vanadium: Investing in storage metals of the future

AVL is an active company advancing a unique integration strategy for vanadium

Highlights

- Quality, grade and tonnage of Gabanintha resource can support a long life, low cost operation
- Detailed mineralogy and metallurgical study showed outstanding results to support project advancement
- A vanadium electrolyte plant is being considered for 2016 construction – to support local vanadium battery sales. Pilot plant under construction in UK will be operational by year end in WA
- Research as part of processing studies will focus on new product markets for vanadium and opportunities to move processing costs lower
- Key agreements in place with leaders in vanadium battery, electrolyte and solar industries
- Subsidiary (VSUN) actively operating vanadium battery re-seller. Significant interest and demand identified for commercial scale solar and storage solutions in Australian urban and rural environments
- Focusing on vertical integration from resource to finished product sale to maximize value and revenue opportunity options
- Tight control of costs essential. Effective use of properly constructed R&D programs can be highly beneficial



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