Investing in the future with Australian Vanadium

Resources Rising Stars May 2016
Vincent Algar
Managing Director
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Comment

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Competent Person Statement – Mineral Resource Estimation

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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.
Who is AVL?

- Vanadium focused ASX listed company
- Active evaluation and development of a long-life, low-cost vanadium Project (Gabanintha) in Western Australia
- Significant project with large, high-grade Measured, Indicated and Inferred resources
- Believe vanadium energy storage market will disrupt global vanadium supply
- Key agreements with Vanadium Battery Suppliers and Solar Energy Installers to develop local market
- AVL offers investors exposure to entire vanadium energy storage value chain
- Focus offers leverage to rising vanadium prices
Corporate Snapshot
Capital structure and major shareholders

Key Statistics (as at 3/0416)

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<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Ordinary shares on issue</td>
<td>998.1m</td>
</tr>
<tr>
<td>Options on issue (ex at 1.47c expire Dec 2017)</td>
<td>258.3m</td>
</tr>
<tr>
<td>Listed Options (ex at 2.0c exp Dec 2018) AVLO</td>
<td>231.8m</td>
</tr>
<tr>
<td>Share price</td>
<td>AUD $0.012</td>
</tr>
<tr>
<td>Market capitalisation (undiluted)</td>
<td>$12m (Cash ~$3.4m)</td>
</tr>
<tr>
<td>Shareholders</td>
<td>2,165</td>
</tr>
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Substantial Shareholders % holding

<table>
<thead>
<tr>
<th>Substantial Shareholder</th>
<th>% Holding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mr Neale Parsons</td>
<td>4%</td>
</tr>
<tr>
<td>Management</td>
<td>7%</td>
</tr>
</tbody>
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Board of Directors Title

<table>
<thead>
<tr>
<th>Board of Directors</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vincent Algar</td>
<td>Managing Director</td>
</tr>
<tr>
<td>Leslie Ingraham</td>
<td>Executive Director</td>
</tr>
<tr>
<td>Brenton Lewis</td>
<td>Non Executive Chairman</td>
</tr>
</tbody>
</table>

AVL Share Price History

Volume Close

austrialianvanadium.com.au
AVL Vertical Integration Strategy

Australian Vanadium Ltd

Steel Market

Construct Electrolyte Plant

Energy Storage Market

Vanadium Steel Market Products (V2O5 and FeV)

Vanadium Battery Market products V2O5 Electrolyte

V2O5 Electrolyte Producer

Develop Gabanintha V-Ti-Fe Project

Battery and Renewable Energy Generation Sales

Australian Vanadium Limited

SUN Renewable Energy Solutions
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
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 grid scale solutions
  - Lifespan of 20 years with very high cycle life and no capacity loss over time
  - Only one electrolyte, $V_2O_5$ which can be recycled
  - Immediate and rapid energy release
  - Excellent charge retention (up to 1 year)
  - 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.*

Ideal applications for VRF:
- Stable, localized power supplies
  - Off-grid
  - Mitigate grid build out
- ‘Behind the Meter’ peak shaving
- RE integration for increasing grid autonomy

Source: GILDEMEISTER Energy Storage
# Vanadium vs Lithium: Key Comparisons

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

Rural Site to benefit from Solar PV plus CellCube to shift to 90% renewable energy self consumption

- First commercial vanadium flow battery to be commissioned in Western Australia.
- The GILDEMEISTER CellCube FB 10-100 is to be installed at a Busselton agricultural property as part of a 15kW solar PV installation.
- Order being filled at GILDEMEISTER facility in Vienna and will be shipped to Fremantle
- The CellCube can deliver up to 10kW of power and has a storage capacity of 100kWh. This can provide up to 10 hours of renewable power to the site, supplied by charging from the solar PV system.
- The CellCube will provide 3-phase power to the site which currently has only a single phase power connection to the grid.
- Our client is expecting to be up to 90% self-sufficient for their power needs
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 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.
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
Vanadium Markets - Overview
Supply and demand outlook offers compelling opportunity for early involvement – particularly with interest from Energy Storage

- Upward price signals are clear from very recent data (RN and BM via TTP Squared analysis)
- FeV prices up between 36% and 41% in past four months
- V₂O₅ prices lagging FEV but also rising
- V₂O₅ prices up 18% in 2016 with indications of deals up to 55% higher.
- Supply under pressure with Highveld Steel (RSA) closed
- Chinese FeV capacity constrained at present due to low demand in 2014/5
- Rising prices make immediate improvement to Gabanintha Project economics due to its higher resource grades
Globally Significant Project
Global Player

Gabanintha Project is significant development project on a global scale in grade and size
Vanadium Peer Comparison

- Gabanintha a globally significant deposit.
- Measured and Indicated Resources of 24.7Mt (HG zone of 57Mt at 1.00% V₂O₅ as part of total 91.4 Mt at 0.82% V₂O₅)
- Undervalued with significant leverage to current share price
- AVL Market Cap of $10m compares to TNG Market Cap of $100M and BMN $24M
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 at 0.82% V₂O₅, 10% TiO₂ and 35% Fe
• Separate high-grade Measured Indicated & Inferred Resource of 56.8Mt at 1.0% V₂O₅, 11% TiO₂ and 42% Fe
• Deposit is at surface suitable for open pit operation and at depth
Gabanintha Vanadium Project
Discrete high-grade zone, simple geometry, suitable for open pit mining
Vanadium Resource
Large high-grade resource

<table>
<thead>
<tr>
<th>Material</th>
<th>JORC Resource Class</th>
<th>Million Tonnes</th>
<th>In situ bulk density</th>
<th>V₂O₅ %</th>
<th>Fe%</th>
<th>TiO₂ %</th>
<th>SiO₂ %</th>
<th>Al₂O₃ %</th>
<th>LOI%</th>
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<tbody>
<tr>
<td>High grade</td>
<td>Measured</td>
<td>7</td>
<td>3.73</td>
<td>1.09</td>
<td>43</td>
<td>12</td>
<td>10</td>
<td>8</td>
<td>3.4</td>
</tr>
<tr>
<td></td>
<td>Indicated</td>
<td>4.3</td>
<td>3.29</td>
<td>1.07</td>
<td>41</td>
<td>12</td>
<td>12</td>
<td>9</td>
<td>4.6</td>
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<tr>
<td></td>
<td>Inferred</td>
<td>45.5</td>
<td>3.67</td>
<td>0.97</td>
<td>42</td>
<td>11</td>
<td>12</td>
<td>8</td>
<td>2.8</td>
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<tr>
<td><strong>Subtotal High Grade</strong></td>
<td></td>
<td><strong>56.8</strong></td>
<td><strong>3.65</strong></td>
<td><strong>1.0</strong></td>
<td><strong>42</strong></td>
<td><strong>11</strong></td>
<td><strong>12</strong></td>
<td><strong>8</strong></td>
<td><strong>3.0</strong></td>
</tr>
<tr>
<td>Low grade</td>
<td>Indicated</td>
<td>13.4</td>
<td>2.39</td>
<td>0.55</td>
<td>24</td>
<td>7</td>
<td>27</td>
<td>19</td>
<td>8.7</td>
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<tr>
<td></td>
<td>Inferred</td>
<td>21.1</td>
<td>2.48</td>
<td>0.53</td>
<td>25</td>
<td>7</td>
<td>27</td>
<td>17</td>
<td>7</td>
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<tr>
<td><strong>Subtotal Low grade</strong></td>
<td></td>
<td><strong>34.6</strong></td>
<td><strong>2.45</strong></td>
<td><strong>0.53</strong></td>
<td><strong>25</strong></td>
<td><strong>7</strong></td>
<td><strong>27</strong></td>
<td><strong>18</strong></td>
<td><strong>7.6</strong></td>
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<tr>
<td><strong>Subtotal Measured</strong></td>
<td></td>
<td><strong>7.0</strong></td>
<td><strong>3.73</strong></td>
<td><strong>1.09</strong></td>
<td><strong>43</strong></td>
<td><strong>12</strong></td>
<td><strong>10</strong></td>
<td><strong>8</strong></td>
<td><strong>3.4</strong></td>
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<tr>
<td><strong>Subtotal Indicated</strong></td>
<td></td>
<td><strong>17.8</strong></td>
<td><strong>2.61</strong></td>
<td><strong>0.68</strong></td>
<td><strong>28</strong></td>
<td><strong>8</strong></td>
<td><strong>23</strong></td>
<td><strong>16</strong></td>
<td><strong>7.7</strong></td>
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<tr>
<td><strong>Subtotal inferred</strong></td>
<td></td>
<td><strong>66.7</strong></td>
<td><strong>3.29</strong></td>
<td><strong>0.83</strong></td>
<td><strong>37</strong></td>
<td><strong>10</strong></td>
<td><strong>17</strong></td>
<td><strong>11</strong></td>
<td><strong>4.1</strong></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td><strong>91.4</strong></td>
<td><strong>3.19</strong></td>
<td><strong>0.82</strong></td>
<td><strong>35</strong></td>
<td><strong>10</strong></td>
<td><strong>18</strong></td>
<td><strong>11</strong></td>
<td><strong>4.8</strong></td>
</tr>
</tbody>
</table>

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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The Concept Study in this presentation (nominal +/- 50% accuracy) is based on low-level technical and economic assessments, and is insufficient to support estimation of Ore Reserves or to provide assurance of an economic development case at this stage, or to provide certainty that the current conclusions of the Concept Study will be realised. While there is a high level of geological confidence associated with Measured and Indicated Mineral Resources, there is no certainty that further exploration and development work will result in the estimation of Ore Reserves.

The Company advises the Concept Study results reflected in this presentation are highly preliminary in nature as conclusions are drawn from the average grade of Measured, Indicated and Inferred Resources. A generic mining cost per tonne of material moved and an average resource grade has been used to determine overall mining and processing costs as opposed to a detailed mining block model evaluation to produce a detailed mining schedule.
Gabanintha Concept Study

Concept engineering study shows economic potential

- Engineering concept study being updated from 2014 to include new resource and metallurgical data
- High quality vanadium electrolyte plant for energy storage products will be part of design, offering significant value uplift opportunity.
- Upgraded resource base, and new study scenarios offers potential and opportunity to significantly improve project economics
- Detailed announcement with new scenarios delayed to end of Q2 2016
- The 2014 study considered production of high-purity (+98.5% $V_2O_5$ flake) via open pit mining, feed preparation/beneficiation and a salt roast-leach extraction process is well understood and commonly available technology
- Study investigated potential plant capacity options of between 5,000 – 10,000 t $V_2O_5$ flake,
- Outcome showed technically low risk project with long life (+20 years)
- Estimated C1 cash operating cost\(^1\) of A$7.26/kg (A$3.29/lb) $V_2O_5$ - could position AVL as a competitive open pit producer (compare Bushveld Minerals PFS C1 Cost of U$3.28/lb)
- Estimated capital cost of 2014 study of A$170 million to A$230 million (based on capacity options)

\(^1\)Estimated C1 cash operating cost

Estimated C1 cash operating cost is as defined in the Tables on page 8 of the ASX announcement dated 15 September 2014, Only site based General and Administration is included
Australian Vanadium: Investing in an energy future

AVL is an active company with a strategy to identify and grow opportunities that lead to cash flows and unique market positions

- Gabanintha resource quality and size can support a long life, low cost operation
- Outstanding metallurgical results support project advancement
- Updated Concept Study with additional scenarios due for release in June, additional scenarios being investigated to optimise project
- Vanadium electrolyte pilot plant to support local vanadium battery sales
- MOU and sales agreement executed with global leader in Vanadium Battery Manufacture – GILDEMEISTER Energy Storage
- MOU in place to collaborate with a leading Australian commercial solar installer
- Significant interest and demand identified for commercial scale solar and storage solutions (VSUN)
- 1:3 Rights Issue successfully completed, raising $3m.
- Active and experienced team developing a multi-commodity project portfolio with low-cost entry positions and unique market positions.