



ASX ANNOUNCEMENT

1<sup>ST</sup> DECEMBER 2020

## VANADIUM OFFTAKE, ELECTROLYTE SUPPLY AND BATTERY SALES MOU

*MOU signed with Singaporean vanadium redox flow battery manufacturer, V-Flow Tech Pte Ltd*

### KEY POINTS

- AVL signs Memorandum of Understanding with vanadium redox flow battery manufacturer V-Flow Tech Pte Ltd.
- Memorandum of Understanding includes development of:
  - Vanadium pentoxide offtake arrangements to support global battery sales by V-Flow Tech;
  - Vanadium electrolyte manufacture and supply for VRFB installations in Australia.
  - Battery sales in Australia through subsidiary VSUN Energy;
  - Battery installation, service and maintenance in Australia.
- First sale of a 5kW/30kWh V-Flow VRFB made for a remote, off-grid WA residential customer by AVL's subsidiary, VSUN Energy Pty Ltd.

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Australian Vanadium Limited (ASX: AVL, "the Company" or "AVL") is pleased to announce that it has signed a Memorandum of Understanding (MOU) with Singapore based vanadium redox flow battery (VRFB) manufacturer, V-Flow Tech Pte Ltd (V-Flow).

The MOU provides a basis for opportunities relating to VRFBs, including:

- Vanadium products ( $V_2O_5$ ) offtake to V-Flow in Singapore to support global battery sales.
- Vanadium electrolyte manufacture and supply in Australia for V-Flow VRFBs.
- Sales agreement with AVL's 100% owned subsidiary VSUN Energy for VRFB sales in Australia.
- VRFB service and maintenance.

Managing Director, Vincent Algar comments, "As AVL confirms its offtake partner strategy for the Australian Vanadium Project, both battery and steel customers from diverse geographical regions

*will underpin our vanadium product sales. VRFB manufacturers around the world have their own particular product strengths and capabilities, offering variants of sizes and capacity. V-Flow's small VRFB is now available from VSUN Energy to small commercial and residential customers, supporting a rapidly growing market sector in Australia. VSUN Energy is actively working on deployment of V-Flow VRFB's into projects in the Australian market, as well as the south-east Asian market."*

*Dr Avishek Kumar, CEO of V-Flow comments, "Australia has great potential for small to mid-size batteries for household and remote microgrid application. V-Flow batteries are a safe and higher performing product, designed to meet this market segment. We are privileged to partner with VSUN Energy to jointly develop this market in Australia. VSUN Energy has a strong base in Australia and already has many potential opportunities for our batteries. In addition, our partnership with AVL will be able to boost the supply chain strategy for vanadium electrolyte. We are looking forward to powering many more Australian homes with locally produced electrolyte from AVL and contributing towards circular economy."*

The key terms of the MOU are:

- The MOU is non-binding.
- Memorandum of Understanding includes potential formal agreements in relation to:
  - Sales, service and maintenance of V-Flow's VRFBs in Australia;
  - Vanadium pentoxide offtake arrangements to support global VRFB sales by V-Flow; and
  - Vanadium electrolyte manufacture and supply in Australia.
- One or more formal and binding agreements concerning the above to be negotiated.
- Each party must pay its own costs in relation to the MOU and any agreements contemplated by the MOU.
- The MOU is for a term of 2 years with an option to renew for a further 12 months by agreement in writing, with a 30-day notice period on either side for termination.

VRFBs are characterised by their longevity and durability. They offer non-flammable energy storage with virtually unlimited cycles. V-Flow's VRFBs can operate in a temperature range of -10°C to +55°C without active cooling. The batteries have a lifespan of 25 years, with a stable performance guarantee.

VSUN Energy has recently sold a 5kW/30kWh V-Flow VRFB as part of a standalone power system for a regional WA customer. The V-Flow VRFB will be marketed to both on and off-grid residential

customers, telecommunications and grid-attached small commercial settings. The V-Flow product can be deployed immediately to this smaller range size of customer as the company has a Clean Energy Council compliant inverter system.

Growing the market for VRFBs is an enabler for AVL's vertical integration strategy to add value to its mined vanadium in Australia. Potential job creation will come through electrolyte manufacturing, battery sales, installations and maintenance.



*Figure 1 A 10kW/100kWh V-Flow VRFB*

For further information, please contact:

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*This announcement has been approved in accordance with the Company's published continuous disclosure policy and has been approved by the Board.*

## ABOUT AUSTRALIAN VANADIUM LIMITED

AVL is an Australian-owned resource company focused on production of high value vanadium products in Australia. AVL is seeking to offer investors a unique exposure to all aspects of the vanadium value chain – from resource through to steel and energy storage. AVL is advancing the development of its world-class Australian Vanadium Project and intends to produce a value-added vanadium product in Australia prior to sale to steel, battery and specialty chemical customers.

The Australian Vanadium Project one of the highest-grade vanadium projects being advanced globally, with 208.2Mt at 0.74% vanadium pentoxide ( $V_2O_5$ ) and containing a high-grade zone of 87.9Mt at 1.06%  $V_2O_5$  reported in compliance with the JORC Code 2012<sup>1</sup>.

AVL has developed a local production capability for ultra-high purity vanadium electrolyte, which forms a key component of vanadium redox flow batteries (VRFB). AVL, through its 100% owned subsidiary VSUN Energy Pty Ltd, is actively marketing the VRFB in Australia.

*The company confirms that it is not aware of any new information or data that materially affects the information included in the original market announcement and, in the case of estimates of Mineral Resources or Ore Reserves, that all material assumptions and technical parameters underpinning the estimates in the relevant market announcement continue to apply and have not materially changed. The company confirms that the form and context in which the Competent Person's findings are presented have not been materially modified from the original market announcement.*

## ABOUT V-FLOW TECH

V-Flow Tech (VFT) is a spin-off from Nanyang Technology University in Singapore, capitalising on 7 years of research to address all the issues faced by flow batteries. The VFT vanadium redox flow battery outperforms in terms of round-trip efficiency, energy density and thermal window. VFT's storage solution has an expected life span of 25 years and is proven to be one of the safest and most environmentally friendly battery technologies. VFT's founders have deep experience in the renewable space, and vanadium redox flow technology in particular. VFT has packaged its unique technology into three product ranges: 1) 20-50kWh batteries for telecom towers or individual homes; 2) 100-250kWh batteries for commercial & industrial applications and micro-grids for remote communities; 3) larger utility-scale deployments to meet the growing need of energy storage.

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<sup>1</sup> See ASX announcement dated 4th March 2020 'Total Vanadium Resource at The Australian Vanadium Project Rises to 208 Million Tonnes'

## APPENDIX 1

The Australian Vanadium Project – Mineral Resource estimate by domain and resource classification using a nominal 0.4% V<sub>2</sub>O<sub>5</sub> wireframed cut-off for low-grade and nominal 0.7% V<sub>2</sub>O<sub>5</sub> wireframed cut-off for high-grade (total numbers may not add up due to rounding).

	Category	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 %
<b>HG</b>	Measured	10.1	1.14	43.9	13.0	9.2	7.5	3.7
	Indicated	25.1	1.10	45.4	12.5	8.5	6.5	2.9
	Inferred	52.7	1.04	44.6	11.9	9.4	6.9	3.3
	<b>Subtotal</b>	<b>87.9</b>	<b>1.06</b>	<b>44.7</b>	<b>12.2</b>	<b>9.2</b>	<b>6.8</b>	<b>3.2</b>
<b>LG 2-5</b>	Indicated	44.5	0.51	25.0	6.8	27.4	17.0	7.9
	Inferred	60.3	0.48	25.2	6.5	28.5	15.3	6.7
	<b>Subtotal</b>	<b>104.8</b>	<b>0.49</b>	<b>25.1</b>	<b>6.6</b>	<b>28.0</b>	<b>16.1</b>	<b>7.2</b>
<b>Trans 6-8</b>	Inferred	15.6	0.65	28.4	7.7	24.9	15.4	7.9
	<b>Subtotal</b>	<b>15.6</b>	<b>0.65</b>	<b>28.4</b>	<b>7.7</b>	<b>24.9</b>	<b>15.4</b>	<b>7.9</b>
<b>Total</b>	Measured	10.1	1.14	43.9	13.0	9.2	7.5	3.7
	Indicated	69.6	0.72	32.4	8.9	20.6	13.2	6.1
	Inferred	128.5	0.73	33.5	8.8	20.2	11.9	5.4
	<b>Subtotal</b>	<b>208.2</b>	<b>0.74</b>	<b>33.6</b>	<b>9.0</b>	<b>19.8</b>	<b>12.1</b>	<b>5.6</b>

## COMPETENT PERSON STATEMENT — MINERAL RESOURCE ESTIMATION

The information in this announcement that relates to Mineral Resources is based on and fairly represents information compiled by Mr Lauritz Barnes, (Consultant with Trepanier Pty Ltd) and Mr Brian Davis (Consultant with Geologica Pty Ltd). Mr Barnes and Mr Davis are both members of the Australasian Institute of Mining and Metallurgy (AusIMM) and the Australian Institute of Geoscientists (AIG). Both have sufficient experience of relevance to the styles of mineralisation and types of deposits under consideration, and to the activities undertaken to qualify as Competent Persons as defined in the 2012 Edition of the Joint Ore Reserves Committee (JORC) Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves. Specifically, Mr Barnes is the Competent Person for the estimation and Mr Davis is the Competent Person for the database, geological model and site visits. Mr Barnes and Mr Davis consent to the inclusion in this announcement of the matters based on their information in the form and context in which they appear.