

ASX ANNOUNCEMENT

11<sup>TH</sup> NOVEMBER 2021

## IGO'S NOVA NICKEL OPERATION TO TRIAL VSUN ENERGY VANADIUM BATTERY STANDALONE POWER SYSTEM

*AVL Federal Government grant funded project to accelerate long duration vanadium battery uptake in mining industry with new installation.*

### KEY POINTS

- IGO Limited (IGO) to trial vanadium redox flow battery (VRFB) standalone power system (SPS) supplied by AVL subsidiary VSUN Energy at its Nova Nickel Operation.
- The VRFB will be initially free issued to IGO, with ownership or rental options after 12 months.
- SPS will power a bore pump with a target of 100% renewable energy use.
- Optimisation of power for pumps is a key area of focus for VSUN Energy across mining and agricultural markets.
- Funded partly by an Australian Government grant, AVL will build a value-added vanadium electrolyte manufacturing plant in Kwinana, WA, capable of producing 33MWh of energy storage capacity for the VRFB sector.
- VSUN Energy, the renewable energy generation and storage subsidiary of AVL, is actively developing markets for VRFBs in Australian markets.
- AVL is developing the Australian Vanadium Project south of Meekatharra in Western Australia, the world's next primary critical mineral vanadium mine for high-strength, low-alloy steel and energy storage.

Australian Vanadium Limited (ASX: AVL, "the Company" or "AVL") is pleased to announce that in conjunction with its 100% owned subsidiary VSUN Energy, it has signed an agreement with ASX 100 listed mining company IGO Limited ("IGO") for a project utilising a standalone power system ("SPS") based on VRFB energy storage technology. An SPS supplies power independently to the

electricity grid and typically comprises a combination of solar, wind, battery and backup generation from diesel or gas.

The SPS being installed at IGO's nickel operation will be based around a 300kWh VRFB from Spanish manufacturer E22. The system has been designed to provide a 100% renewable energy supply for much of the year, with periods of long cloud cover being supported by a diesel genset. Total renewable penetration of 85-90% is being targeted for the trial of the VRFB based SPS system. The SPS is redeployable for use on multiple mines sites and locations over its 20+ year service life. The target of long periods with diesel-off will not only significantly reduce the carbon emissions of diesel generator powered bore fields, but also offer substantial reductions in operating hours for service personnel. These two significant benefits indicate a potentially rapid growth market segment for this robust technology.

Managing Director Vincent Algar comments, *"Working with IGO on this project will accelerate the objectives of the companies and broader mining industry towards carbon neutrality. The robustness of VRFB energy storage makes it perfectly suited to the tough environments found on many Australian minesites. The installation of an SPS based on vanadium technology for pumping applications enables diesel to be almost entirely eliminated, helping reduce overall carbon emissions and providing reliable green power. We look forward to trialling and then duplicating this system based on an Australian invention and with Australian made vanadium electrolyte from AVL in WA."*

IGO's Chief Operating Officer, Matt Dusci comments, *"IGO's strategic focus is on those products that are critical to enabling clean energy solutions, to create a better planet. As part of our strategy to deliver those products, we aspire to be carbon neutral across our business and to do this, in part, by leveraging renewable energy solutions and innovation to reduce emissions at our remote exploration and mining operations. We are excited to be collaborating with AVL on this pilot at our Nova operation"*.

The IGO Nova Nickel Operation is located approximately 160km east-northeast of Norseman and 360km southeast of Kalgoorlie in Western Australia. The mine produces nickel, copper and cobalt.

In July 2021 AVL was awarded a \$3.69M Federal Government manufacturing grant under the Modern Manufacturing Initiative Resources Technology and Critical Minerals Processing National Manufacturing Priority roadmap<sup>1</sup>. Part of the matched funding is allocated to development of the SPS that will be installed at IGO's Nova Nickel Operation. The remainder of the grant will be used to finalise the high purity processing circuit for the Australian Vanadium Project; build and operate a

<sup>1</sup> See ASX announcement dated 21<sup>st</sup> July 2021 'AVL Awarded \$3.69M Federal Government Manufacturing Grant'

commercial vanadium electrolyte manufacturing plant producing 33MWh per annum and manufacture a prototype of a residential VRFB.

The agreement with IGO will end 12 months from the date of system commissioning and first power production, unless extended or terminated in accordance with the agreement. The SPS is being provided to IGO at no charge, with the option to purchase or rent the system at the end of the trial period. The project will enable IGO to analyse the performance of the SPS for potential use in its dewatering and bore pumps systems.

VRFBs are particularly well suited as an SPS due to the following attributes:

- **Non-flammable** – safe to be operated in areas prone to bushfire and other sensitive areas.
- **High cycle life** – the VRFB can be cycled tens of thousands of times with virtually no degradation in capacity. With a lifespan exceeding 20 years, the VRFB has longevity that matches renewable energy generation sources such as solar PV and will not require replacement multiple times over the life of a project.
- **Sustainability** - at the end of the project, the VRFB can be fully recycled. The power unit of the battery is able to be recycled whilst the electrolyte can either be reused in another battery or have the vanadium reclaimed for use within the steel industry. AVL will have the capability to recycle the electrolyte onsite in WA as part of AVL's fully integrated VRFB strategy.
- **High temperature tolerance** - the VRFB has a wider operating temperature range than most other energy storage technologies, giving it the ability to be deployed in all regions of Australia.
- **Flexibility** – the VRFB can be used in a variety of roles over its lifespan and is only limited by the control system being used.

VSUN Energy is in discussions with other mining companies and customers in the agricultural sector and will be able to share the findings from the IGO project with them.

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 LTD

AVL is a resource company focused on vanadium, seeking to offer investors a unique exposure to all aspects of the vanadium value chain – from resource through to steel and energy storage opportunities. AVL is advancing the development of its world-class Australian Vanadium Project at Gabanintha. The Australian Vanadium Project is currently one of the most advanced vanadium projects being developed globally, with 239Mt at 0.73% vanadium pentoxide ( $V_2O_5$ ), containing a high-grade zone of 95.6Mt at 1.07%  $V_2O_5$ , reported in compliance with the JORC Code 2012 (see ASX announcement dated 1<sup>st</sup> November 2021 '*Mineral Resource Update at the Australian Vanadium Project*' and ASX announcement dated 22<sup>nd</sup> December 2020 '*Technical and Financial PFS Update*').

VSUN Energy is AVL's 100% owned subsidiary which is focused on developing the market for vanadium redox flow batteries for energy storage.

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.

## 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).

2021 Nov	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 %
HG	Measured	11.3	1.14	43.8	13.0	9.2	7.5	3.7
	Indicated	27.5	1.10	45.4	12.5	8.5	6.5	2.9
	Inferred	56.8	1.04	44.6	11.9	9.4	6.9	3.3
	<b>Subtotal</b>	<b>95.6</b>	<b>1.07</b>	<b>44.7</b>	<b>12.2</b>	<b>9.1</b>	<b>6.8</b>	<b>3.2</b>
LG 2-5	Indicated	54.9	0.50	24.9	6.8	27.6	17.1	7.9
	Inferred	73.6	0.48	25.0	6.4	28.7	15.3	6.6
	<b>Subtotal</b>	<b>128.5</b>	<b>0.49</b>	<b>24.9</b>	<b>6.6</b>	<b>28.2</b>	<b>16.1</b>	<b>7.2</b>
Trans 6-8	Inferred	14.9	0.66	29.0	7.8	24.5	15.1	7.8
	<b>Subtotal</b>	<b>14.9</b>	<b>0.66</b>	<b>29.0</b>	<b>7.8</b>	<b>24.5</b>	<b>15.1</b>	<b>7.8</b>
Total	Measured	11.3	1.14	43.8	13.0	9.2	7.5	3.7
	Indicated	82.4	0.70	31.7	8.7	20.7	12.0	5.4
	Inferred	145.3	0.71	33.0	8.7	20.7	12.0	5.4
	<b>Subtotal</b>	<b>239.0</b>	<b>0.73</b>	<b>33.1</b>	<b>8.9</b>	<b>20.4</b>	<b>12.3</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.

## COMPETENT PERSON STATEMENT — ORE RESERVES

The technical information in this announcement that relates to the Ore Reserve estimate for the Project is based on information compiled by Mr Ross Cheyne, an independent consultant to AVL. Mr Cheyne is a Fellow of the Australasian Institute of Mining and Metallurgy. He is an employee and Director of Orelogy Mine Consulting Pty Ltd. Mr Cheyne has sufficient experience that is relevant to the style of mineralisation and type of deposit under consideration and to the activity being undertaken to qualify as a competent person as defined in the 2012 Edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves. Mr Cheyne consents to the inclusion in the announcement of the matters related to the Ore Reserve estimate in the form and context in which it appears.

## COMPETENT PERSON STATEMENT – METALLURGICAL RESULTS

The information in this announcement that relates to Metallurgical Results is based on information compiled by independent consulting metallurgist Brian McNab (CP. BSc Extractive Metallurgy). Mr McNab is a Member of AusIMM. He is employed by Wood Mining and Metals. Mr McNab has sufficient experience which is relevant to the style of mineralisation and type of deposit under consideration and to the activity which is undertaken, to qualify as a Competent Person as defined in the JORC 2012 Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves. Mr McNab consents to the inclusion in the announcement of the matters based on the information made available to him, in the form and context in which it appears.



## FORWARD-LOOKING STATEMENTS

This release may contain certain forward-looking statements with respect to matters including but not limited to the financial condition, results of operations and business of AVL and certain of the plans and objectives of AVL with respect to these items.

These forward-looking statements are not historical facts but rather are based on AVL's current expectations, estimates and projections about the industry in which AVL operates and its beliefs and assumptions.

Words such as "anticipates," "considers," "expects," "intends," "plans," "believes," "seeks," "estimates", "guidance" and similar expressions are intended to identify forward looking statements and should be considered an at-risk statement. Such statements are subject to certain risks and uncertainties, particularly those risks or uncertainties inherent in the industry in which AVL operates.

These statements are not guarantees of future performance and are subject to known and unknown risks, uncertainties, and other factors, some of which are beyond the control of AVL, are difficult to predict and could cause actual results to differ materially from those expressed or forecasted in the forward-looking statements. Such risks include, but are not limited to resource risk, metal price volatility, currency fluctuations, increased production costs and variances in ore grade or recovery rates from those assumed in mining plans, as well as political and operational risks in the countries and states in which we sell our product to, and government regulation and judicial outcomes. For more detailed discussion of such risks and other factors, see the Company's Annual Reports, as well as the Company's other filings.

AVL cautions shareholders and prospective shareholders not to place undue reliance on these forward-looking statements, which reflect the view of AVL only as of the date of this release.

The forward-looking statements made in this announcement relate only to events as of the date on which the statements are made.

AVL will not undertake any obligation to release publicly any revisions or updates to these forward-looking statements to reflect events, circumstances or unanticipated events occurring after the date of this announcement except as required by law or by any appropriate regulatory authority.