Australian VANADIUM LIMITED

Growth Capital Investment Opportunity

VSUN Energy – a growing Australian long-duration energy storage platform

May 2025

ASX:**AVL**

Disclaimer and confidentiality notice

This presentation and its contents have been prepared by Australian Vanadium Limited ACN 116 221 740 (**AVL**), for the sole purpose of providing limited, preliminary information to assist the recipient in evaluating whether to express interest in a potential investment in AVL and/or its subsidiary businesses, including VSUN Energy Pty Ltd ACN 155 690 565.

By accepting receipt of this presentation, the recipient acknowledges and agrees to be bound by the terms and conditions of this disclaimer and confidentiality notice. If you do not agree to be bound by these terms and conditions, please delete this presentation.

This document is provided for your internal use only. The presentation is provided to the recipient on the express condition that it is kept strictly confidential. By accepting receipt of this presentation, the recipient agrees to treat all information contained herein, and any additional information made available in connection with the proposed transaction (whether written, oral or otherwise), as strictly confidential. The recipient must not reproduce, distribute or disclose this presentation or any related information to any other person without the prior written consent of AVL, except to its professional advisers on a strictly need-to-know basis, provided those advisers are bound by equivalent confidentiality obligations.

AVL reserves the right, in their absolute discretion, to withdraw or amend the presentation and to terminate or modify the process relating to the proposed transaction at any time without notice and without liability.

The information presented in this presentation does not constitute investment advice or a recommendation and is not an offer or invitation to acquire any securities, assets or interests in AVL or its businesses and is not intended to form the basis of any investment or acquisition decision. Nothing in this presentation is intended to nor will create any binding obligation on anyone.

All information contained in this presentation has been prepared in good faith by AVL. All estimates, projections, forecasts, prospects, expressions of opinion and other subjective judgements contained in this material are based on assumptions considered to be reasonable as of the date upon which the presentation was last updated and must not be construed as a representation that the matters referred to therein will occur. Any plans, projections or forecasts mentioned on this presentation may not be achieved due to multiple risk factors including without limitation legal or regulatory exposure, market volatility, sector volatility, corporate actions, or the unavailability of complete and accurate information.

AVL, nor any of AVL's advisers, directors, employees or agents, has independently verified any of the information, including the forecasts, prospects and projections contained in this presentation. Accordingly, to the full extent permitted by law, no representation or warranty, express or implied, is made by AVL or any of its associates, affiliates or subsidiary companies or any of their respective directors, officers, employees, advisers, representatives or agents or any other person or entity as to the fairness, adequacy, accuracy or completeness of the information or opinions contained on or accessed through this presentation or any written or oral information subsequently made available to any party, and no responsibility or liability whatsoever is accepted by any such person in relation to any such information or opinion (whether by reason of negligence, negligent misstatement or otherwise) arising from any statement, opinion or information, expressed or implied, arising out of, contained in or derived from or omitted from this presentation.

By accessing this presentation, you agree to rely solely on your own knowledge, investigation, judgement and assessment of the matters which are the subject of this material and any information which is made available in connection with any further enquiries and to satisfy yourself as to the accuracy and completeness of such matters. The investment opportunities described in this presentation are high risk. Prospective investors must be sophisticated investors, should be capable of evaluating the risks and merits associated with any investment and should have sufficient resources to bear any losses.

About Australian Vanadium Limited (ASX: AVL)

Corporate snapshot

Capital structure	
ASX ticker	AVL
ASX share price (27 May 2025)	A$0.01
Shares on issue	8,635M
Market capitalisation	A$86M
Cash[1]	A$17M
Debt	Nil

Key shareholders	
Resource Capital Funds	18.1%

Board	
Cliff Lawrenson *Non-Executive Chair*	• Non-Exec. Chair of Paladin Energy (ASX: PDN) • Significant ASX board experience • Distinguished international career in banking, resources & energy
Jo Gaines *Non-Executive Director*	• Highly regarded leader and strategic policy director • Former Deputy Chief of Staff to former WA Premier
Daniel Harris *Non-Executive Director*	• >40 years of global vanadium industry experience • Former US Vanadium director
Miriam Stanborough AM *Non-Executive Director*	• Held senior positions at Monadelphous, Iluka Resources and Alcoa • Director of PLS (ASX: PLS) & BCI Minerals (ASX: BCI) • Member of the Order of Australia (AM) – awarded for service to the minerals and mining sector and to the community
Peter Watson *Non-Executive Director*	• Experienced ASX director with >40 years in senior executive, technical and project management roles

Key assets (100% owned by AVL)	Stage of vanadium value chain
Australian Vanadium Project	Upstream
Vanadium electrolyte plant	Midstream
VSUN Energy	Downstream

Notes:
1. As at 31 March 2025

AVL is vertically integrated across the vanadium supply chain and includes its 100% owned VSUN Energy business, a leading vanadium flow battery platform with strong project deployment opportunities

	Upstream	Midstream	Downstream
			
	Vanadium mining and processing	**Vanadium electrolyte manufacture**	**Utility scale vanadium flow batteries**
AVL asset	**Australian Vanadium Project**	**Electrolyte manufacturing facility**	**VSUN Energy**
AVL competitive advantage	High-grade project in Tier-1 jurisdiction capable of potentially delivering future oxide production for VFB BESS electrolyte	Operational facility. Electrolyte being qualified for utilisation with leading VFB OEMs	Commercial VFB BESS projects and the development of Project Lumina positions VSUN Energy as a leader in VFB BESS deployment in Australia
Production capacity (energy equivalent)	~1.2GWh (when fully operational)	~33MWh	n/a
Status	Closing in on FID: ✓ Advanced definitive feasibility ✓ Advanced permitting	✓ Producing battery-grade electrolyte ✓ Deployed into operating BESS	✓ Track record deploying VFBs in Aust. ❑ Utility scale VFB BESS – Q3 CY2025
Direct job creation	Construction: 1,050 Operation: 330 (rural and regional sites)	Construction: 30 (per electrolyte site) Operation: 15 (per electrolyte site)	Construction: 150 (per VFB site) Operation: 5 (per VFB site)

Australian government support is strongly aligned to AVL's vertically integrated strategy

AVL is seeking growth capital for its VSUN Energy business to accelerate the adoption of vanadium flow batteries in Australia

Transitioning Australia's energy market will not happen without rapid growth in longer duration energy storage

Renewable energy generation is rapidly increasing and with it the need for long duration storage to be deployed at scale to stabilise the grid. By 2040, Australia is projected to need 120GWh of storage with built-in long-duration capabilities. Vanadium is an abundant critical mineral and is already globally distributed, with major reserves in Australia, creating an opportunity for a sovereign long duration storage supply chain in the Australian market using vanadium flow batteries (VFBs).

VFBs may offer competitive LCOS, longer lifespans and reduced reliance on foreign supply chains compared to lithium solutions

Lithium-ion storge solutions are currently the most prevalent for 2hr and 4hr storage requirements, but as the need for longer duration storage intensifies, VFBs may prove to be a superior solution. VFBs are a proven storage technology, deployed at scale in China with traction building in other major markets such as Japan and the USA. VFBs can perform a similar role as lithium-ion solutions, but have a longer lifespan, are non-flammable, recyclable, operate without material degradation, and have higher cycle rates when compared to traditional lithium-based solutions.

VSUN Energy is an Australian business strategically positioned to capture the long duration energy storage opportunity

VSUN Energy is a market-leading Australian VFB developer, strategically positioned to capitalise on the growing demand for long-duration energy storage (LDES). VSUN Energy is currently progressing the design and development of an 8-hour VFB solution for near-term deployment into the Australian energy market. Its technology integrates with solar and wind, supporting grid stability and firming, enabling the continuation of this model for market participants.

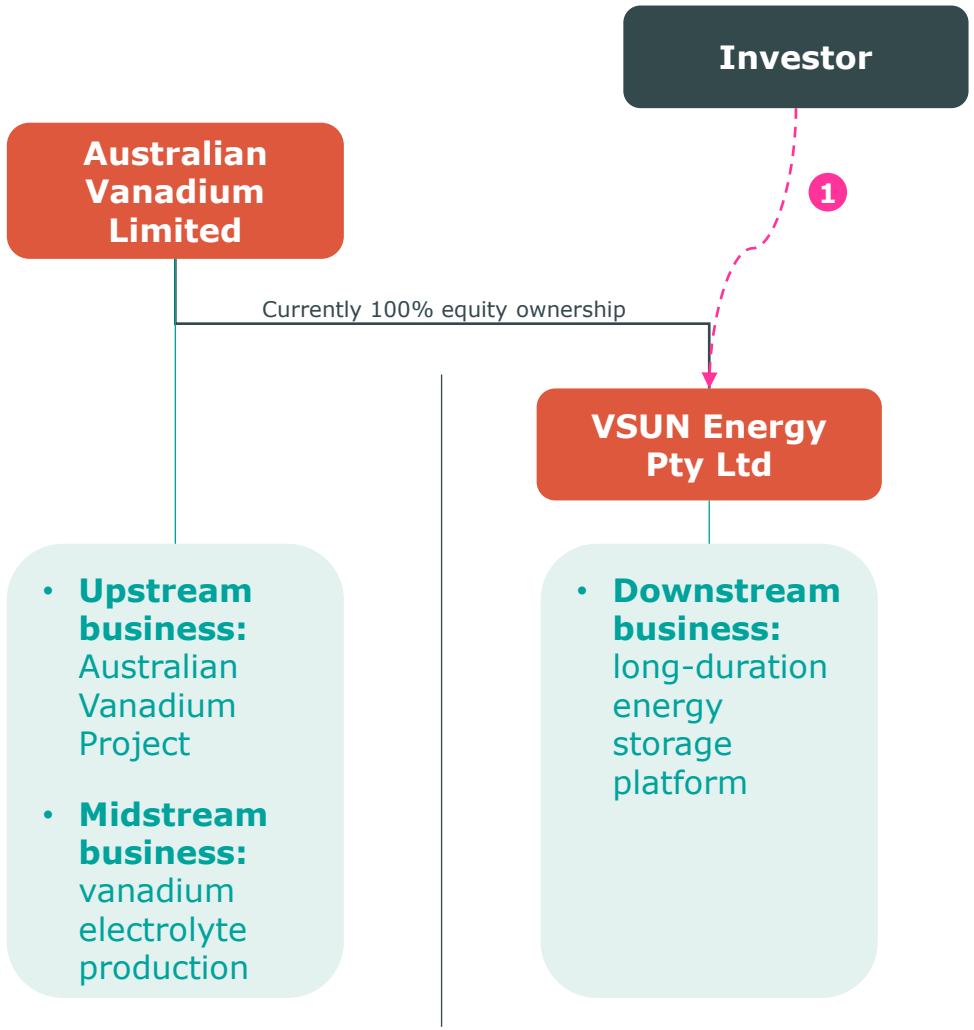
Significant equity stake available to enable investment into a pipeline of quality Australian projects

The intent of this raise process is to support VSUN Energy through the finalisation of its detailed design workstream so that it may rapidly capture available LDES opportunities. VSUN Energy is pursuing a current (and growing) pipeline of 11 potential VFB project opportunities in the Australian market, totalling over 7GWh. Opportunities include the 50MW/500MWh Kalgoorlie VFB in WA and the Melbourne Renewable Energy Hub B.

Overview of VSUN Energy investment opportunity

	Investment Opportunity
	Direct investment of A$25M into VSUN Energy, AVL's wholly-owned downstream business
Comment / rationale	• Significant stake available via equity or convertible notes - there is flexibility on instruments and structure • Growth capital to create an Australian long-duration energy storage *platform* using vanadium flow batteries with pipeline of high-quality projects • Active investment process underway – further details can be provided • Pipeline supports near-term deployment of >A$150M in equity
Offtake / additional partnerships	• Potential UAE VFB deployment: while VSUN Energy will initially focus on Australia, its VFB IP and capabilities are transferable globally, supported by AVL's vanadium oxide offtake
Use of funds	• Establish VSUN Energy as a long-duration energy storage platform with a high-conviction project pipeline
Investment structure	• Refer to slide 7 for the indicative investment structure

Corporate structure and indicative investment structure



Current relationship between AVL and VSUN Energy

- VSUN Energy is AVL's 100% owned vanadium flow battery business
- AVL's strategy is for VSUN Energy to develop a VFB-based long-duration energy storage platform in Australia, which will drive vanadium demand outside China, supporting a favourable market for AVL to advance its upstream mining and processing operations and expand its midstream activities. A strong VSUN Energy may also serve as a strategic offtake partner for AVL's vanadium oxide or electrolyte products

Investment description

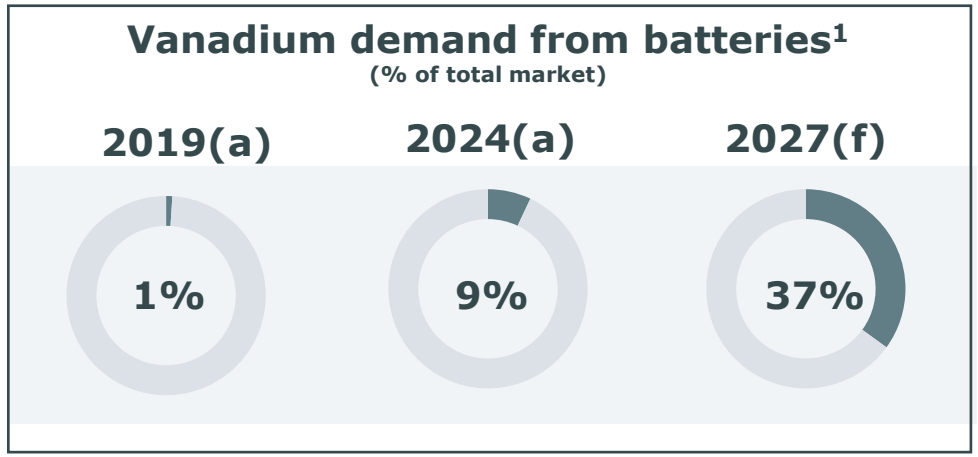
1 Direct investment of A$25M into VSUN Energy

- Potential alternatives include, but are not limited to:
  i. placement of new VSUN Energy shares to incoming investor; or
  ii. issue of convertible notes by VSUN Energy to incoming investor
- Appropriate and market standard governance structure to be agreed between AVL and the incoming investor

About Vanadium
Global supply and demand overview

Demand

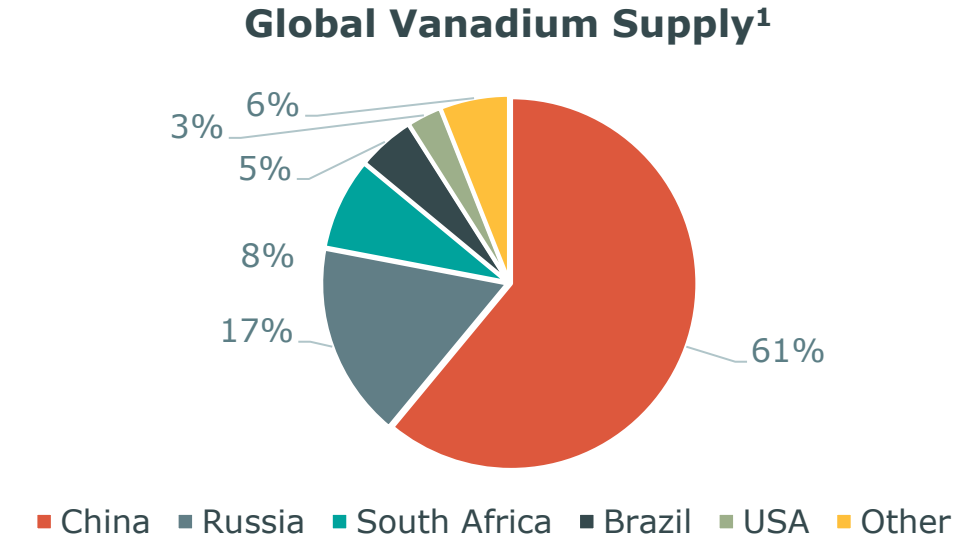
Vanadium market demand is currently dominated by use in the steel industry, although its exposure to the energy transition through vanadium flow batteries is forecast to provide a material diversification from steel



(a) actual (f) forecast

Supply

Global vanadium market of 133,000 MTV* in 2024. Over 75% of global vanadium supply currently sourced from China, Russia and South Africa, giving rise to supply chain concerns

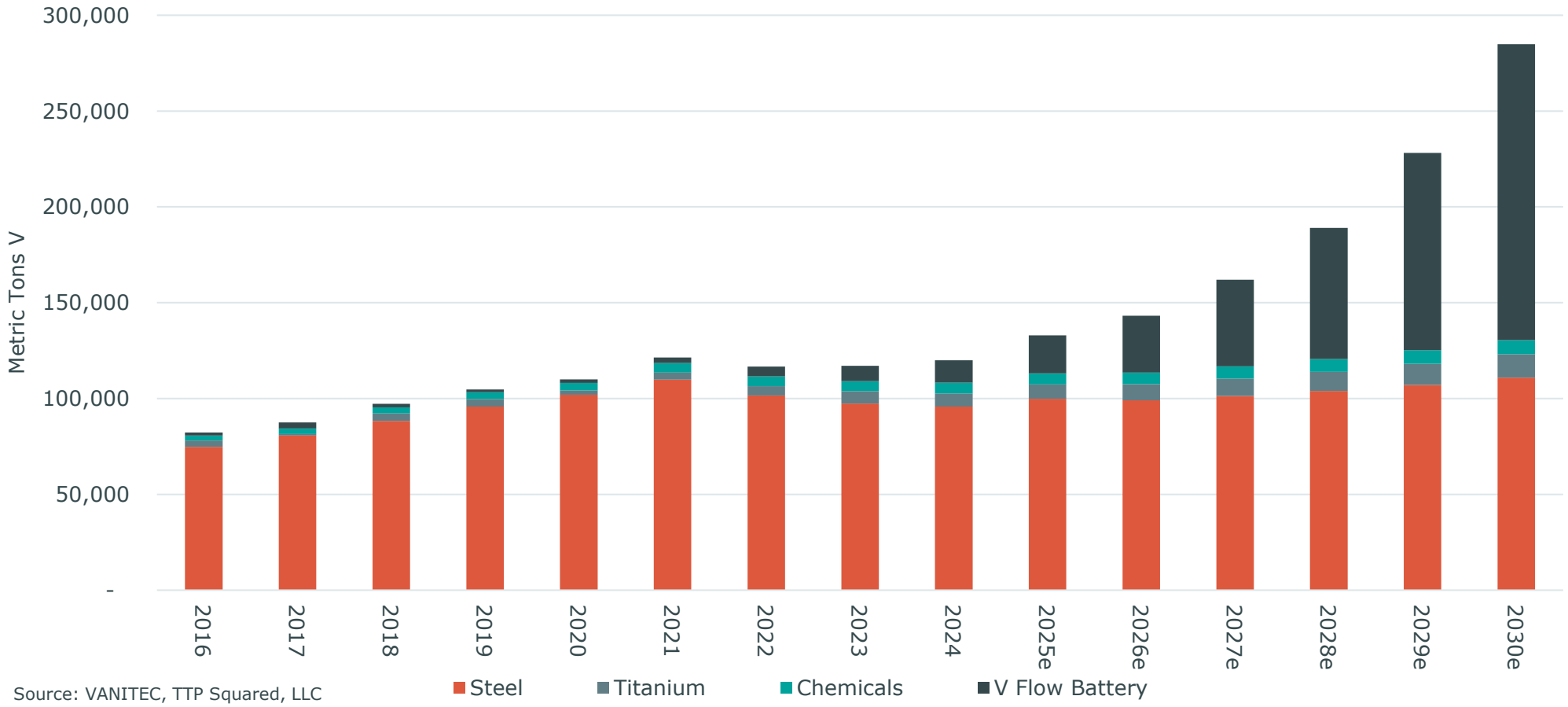


1. US based vanadium market specialist, TTP Squared, Inc

* MTV is metric tonne unit of vanadium

About Vanadium

Actual and forecast vanadium consumption by application

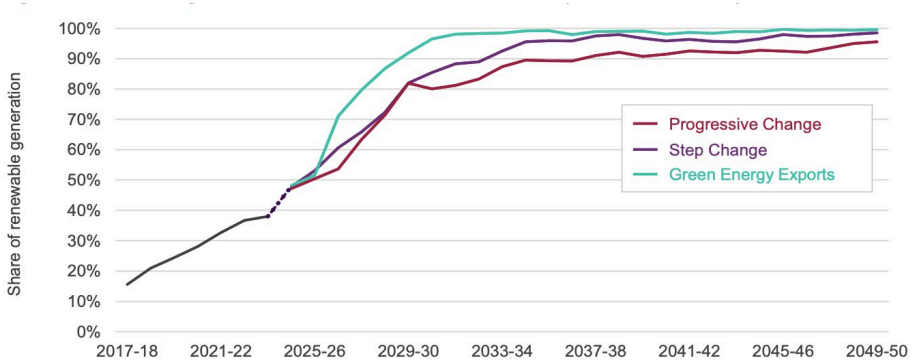


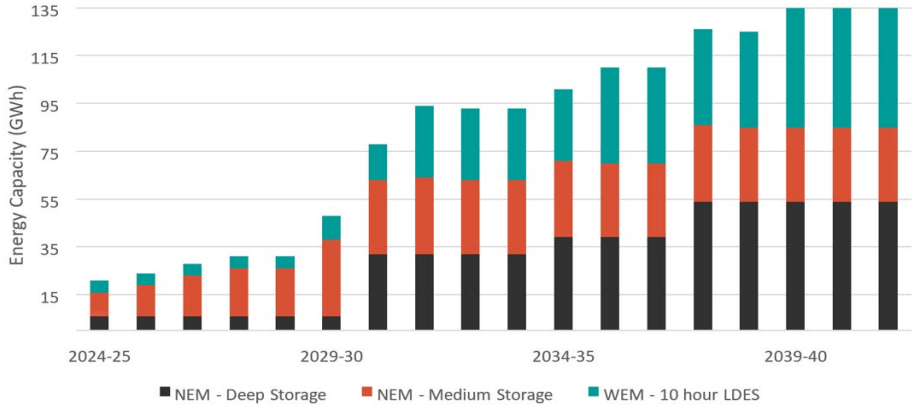
Source: VANITEC, TTP Squared, LLC

VSUN Energy

Transitioning Australia's NEM will not happen without rapid growth in longer duration energy storage

Generation from renewable sources – NEM[1] (%)





Renewable energy generation is set to rapidly increase …

… driving the need for long duration storage to stabilise the grid

Australia's market for VFB BESS

120 GWh by 2040
(excluding pumped hydro)

Annual growth of 7 GWh over ~25 years

Implied average duration 11 hours
(excluding pumped hydro)

Source: Australian Energy Market Operator (AEMO) - Integrated system plan for the national electricity market (2024).

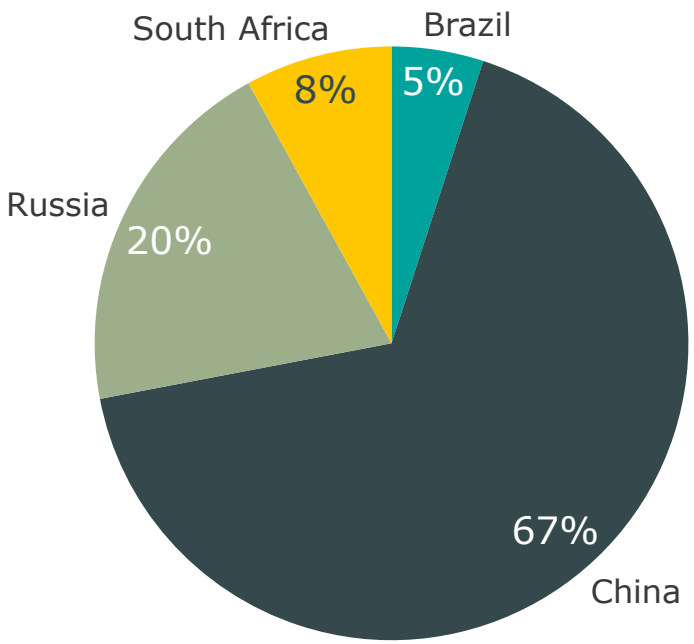
Notes: 1. NEM – National Electricity Market (the electricity market of the eastern and southeastern states of Australia); 2. WEM – Wholesale Electricity Market (the electricity market of Western Australia's South-West Interconnected System – SWIS).

VSUN Energy

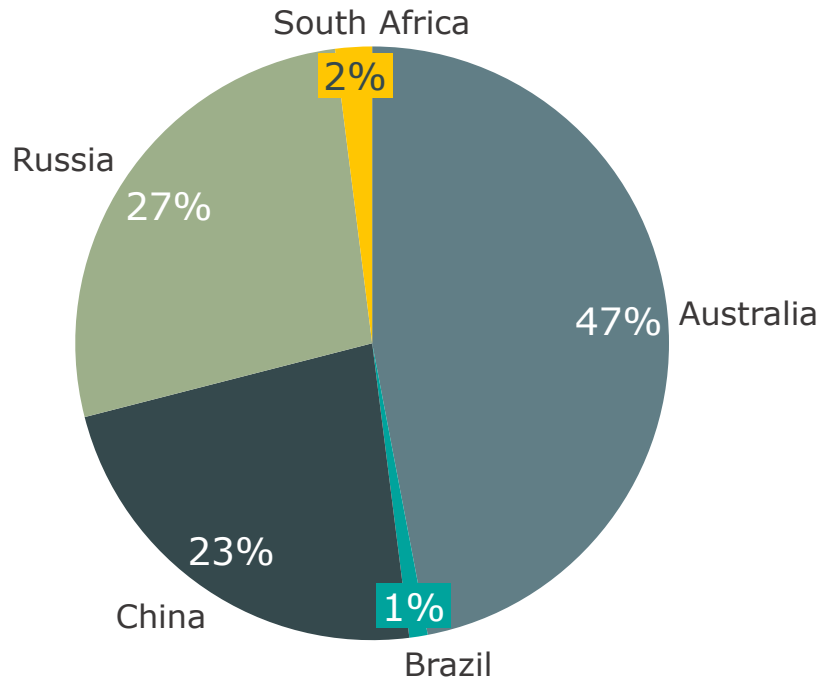
VFB deployment in Australia may benefit from Australia's large vanadium resource base, securing supply chains

Making domestic sources of vanadium electrolyte is essential to meet Australian VFB demand due to supply uncertainty, geopolitical risks, tariffs, and shipping costs from international markets.

Global vanadium production (2024)



Global vanadium resources (2025)



Source: US Geological Survey - Mineral Commodity Summaries (2025)

VSUN Energy

VFB adoption in China is already at GWh scale with global traction increasing – Australia has the ingredients to be a fast follower

Australia exhibits similar characteristics to China for renewable energy penetration with established BESS offerings and significant vanadium resources, positioning it to capitalise on the need for domestic long-duration storage solutions

China

China's VFB sector is positioned for **significant growth,** with **~12 GWh of operational capacity** and an additional **~14 GWh of projects announced** to be completed

Rongke Power

- 100MW x 4 hour, operational since 2022

Services: support grid stability, peak shaving, frequency regulation, renewable integration, black start, auxiliary power supply

Japan

Japan's VFB market is dominated by **Sumitomo Electric Industries** with **~176 MWh of operational capacity**

Minami-Hayakita Substation

- 15MW 4 hour, operational since 2015 and a second system 17MW 3-hour, operational since 2022

Services: frequency regulation, renewable generation smoothing

USA

The US market has ~40MWh of VFBs currently online. Led **by Sumitomo Electric's first USA** operational VFB project, the market is **now diversifying** with contributions from **Invinity, VRB Energy and Cellcube**

DGE&E VFB Microgrid

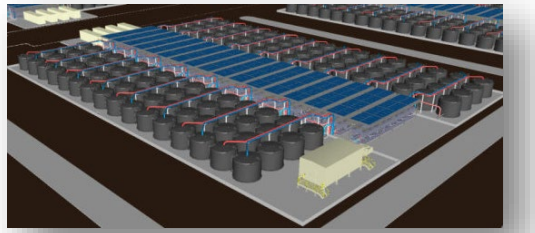
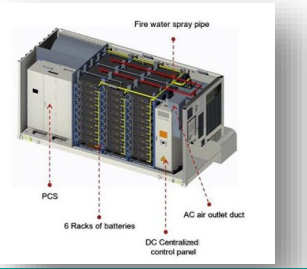
- 2 MW 4 hour, operational since 2017

Services: microgrid operation, peak shaving, renewable firming, market participation and ancillary services

Sources: China Iron & Steel Research Institute Group (CISRI) - VTC Workshop (2024); Sumitomo Electric – VRFB Project in California (2025).

VSUN Energy

VFBs are better suited for utility-scale, long-duration storage, offering a cost-competitive, safer and longer-lasting solution

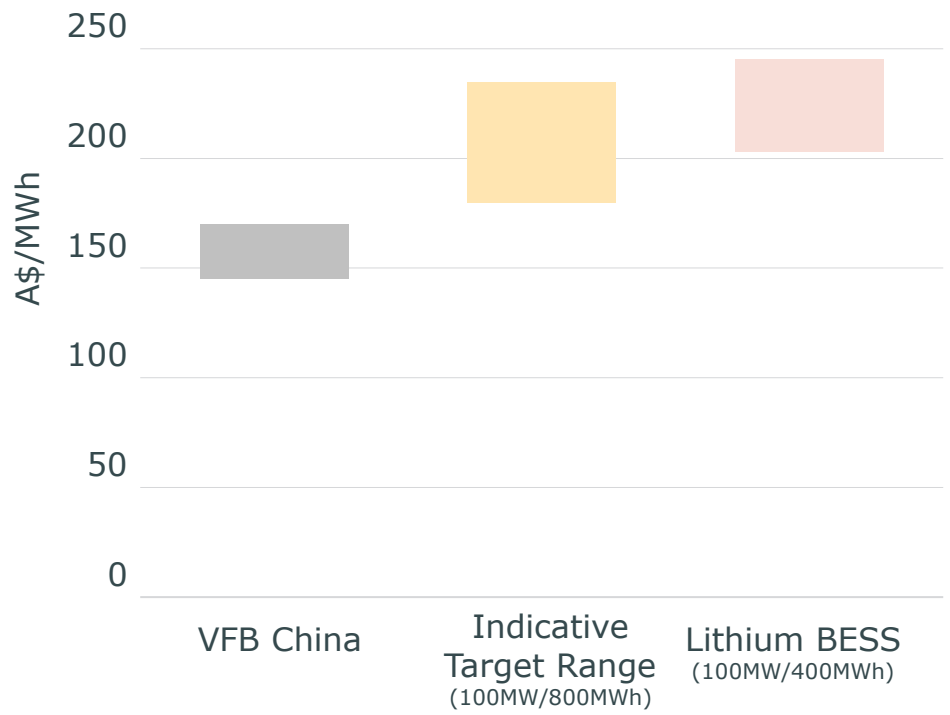
	VFB BESS*	Lithium-ion BESS
		
Levelised Cost of Storage (LCOS)	A$251/MWh (+/-30%) for 100MW/800MWh VFB[1]	A$240/MWh - A$425/MWh (100MW/400MWh)[2]
Asset life	30+ years	10-20 years
Scalability & extending duration	Increase storage capacity through additional tanks without modifying core system	Storage capacity is fixed by number and size of battery cells, so to increase duration, additional battery modules or systems must be added
Degradation	Potential to maintain 100% capacity throughout its lifetime i.e., no degradation	Capacity typically degrades at a 1-3% per year
Safety	Non-flammable, meaning it poses no fire risk and does not require special site considerations	Grid-scale LiBESS has demonstrated thermal runway risk, limited its access to potential sites
Recyclability	Potential for over 99% commercial end-of-life reuse and recyclability as vanadium electrolytes are fully reusable and the VFB design is modular using predominately non-toxic materials	Only 5-10% of Li-ion batteries are recycled due to collection challenges, high costs and limited infrastructure, despite a potential recyclability rate of 98%

1: Refer AVL.ASX announcement dated 6 November 2024 '*Realising AVL's utility scale vanadium flow battery strategy'*. 2. Lazard 2024 LCOE report
Sources: Future Batteries Volume 5 - Sustainable recycling and regeneration of redox flow battery components (2025); GridX - Battery Degradation (2025); BEASFA – Recycling lithium-ion batteries around the world and Africa (2024);NREL – Cost projections for utility-scale battery storage (2023).
* VFB BESS image is rendering as part of ongoing VFB design work.

VSUN Energy

VFBs are cost-competitive with lithium-ion BESS – this increases with duration

Levelised cost of storage (LCOS)



LCOS key takeaways

China's VFBs are cheaper than lithium-ion BESS

China achieves a lower VFB LCOS than lithium-ion, highlighting the potential of the VFB market. This cost advantage is driven by lower labour expenses, an efficient supply chain and the experience of operating the technology

VSUN Energy's VFB BESS solution targets cost-competitiveness with lithium-ion BESS

VFBs are cost-competitive, seeking to outperform lithium-ion BESS in longer term duration due to their scalability, longevity and operational flexibility

Lithium-ion BESS sets the benchmark BESS price

Lithium batteries are a well-established technology, and their widespread adoption demonstrates market price acceptance for large-scale utility battery systems at current cost levels

Sources: Zhang Huamin - Current Status and Prospects of Flow Battery Energy Storage Technology (2024), Lazard - LCOE Report June (2024).

VSUN Energy

VSUN Energy utility-scale VFB is focused incremental scaling and cost competitiveness

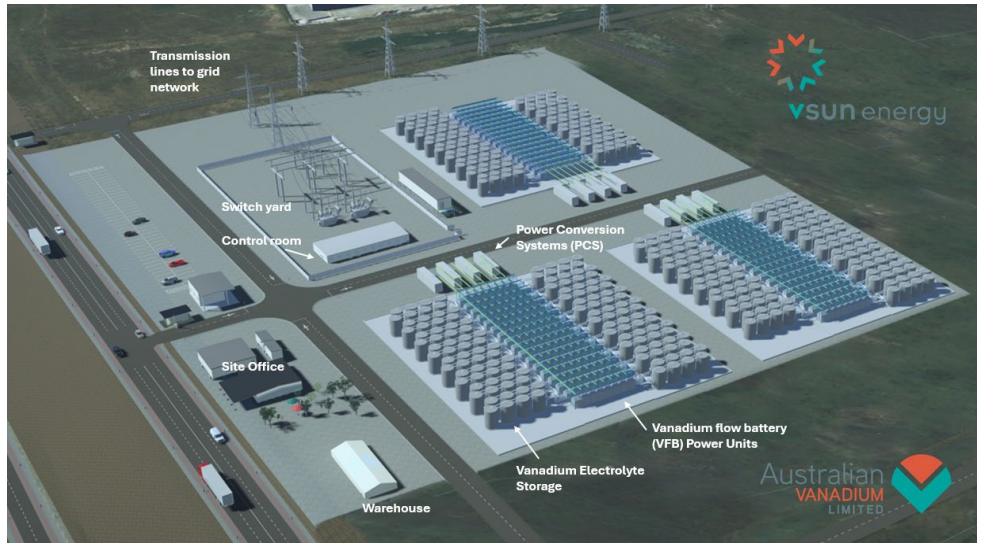
VSUN Energy's VFB design partners with established proven cell stack technology brands and local suppliers to create this scalable, turnkey, utility-scale VFB

Benefits: Removing the electrolyte tanks and pumps from containers delivers material benefits including:

- Rapid deployment
- Allows for low capital intensity duration expansion
- Future proofs the VFB BESS to allow for capacity additions as market pricing signals mature
- Ability to expand beyond 12 hours
- Targeting 70%+ local Australian components
- Designing for 30+ year operational life
- Utilises proven low-risk cell stack technology with secured providers and early contractor involvement, including:

cellcube SEDGMAN GENUS

VSUN Energy 's rendering of 50MW VFB BESS



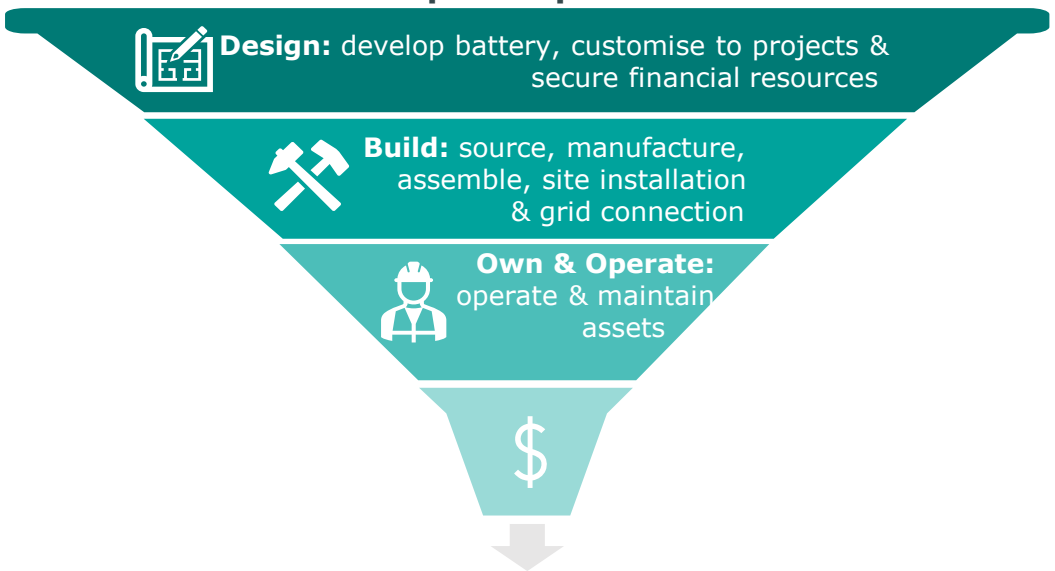
Target detailed design for investment decision by Q3 CY2025

VSUN Energy

VSUN Energy offers entry level participation in a VFB BESS platform specifically targeting long duration storage

VSUN Energy intends to follow the established BESS deployment pathway in Australia, which has already seen over 2GWh of storage capacity installed. However, unlike others, VSUN Energy will leverage VFB technology to target a growing pipeline of long-duration energy storage opportunities.

Proposed business model for build, own, operate (BOO) BESS-specific platforms



Potential revenue opportunities

Contracted energy offtake	Energy arbitrage	Frequency control ancillary services
Capacity markets	Renewable energy integration (firming)	Grid services

Examples of Australian BESS BOO platforms[1]

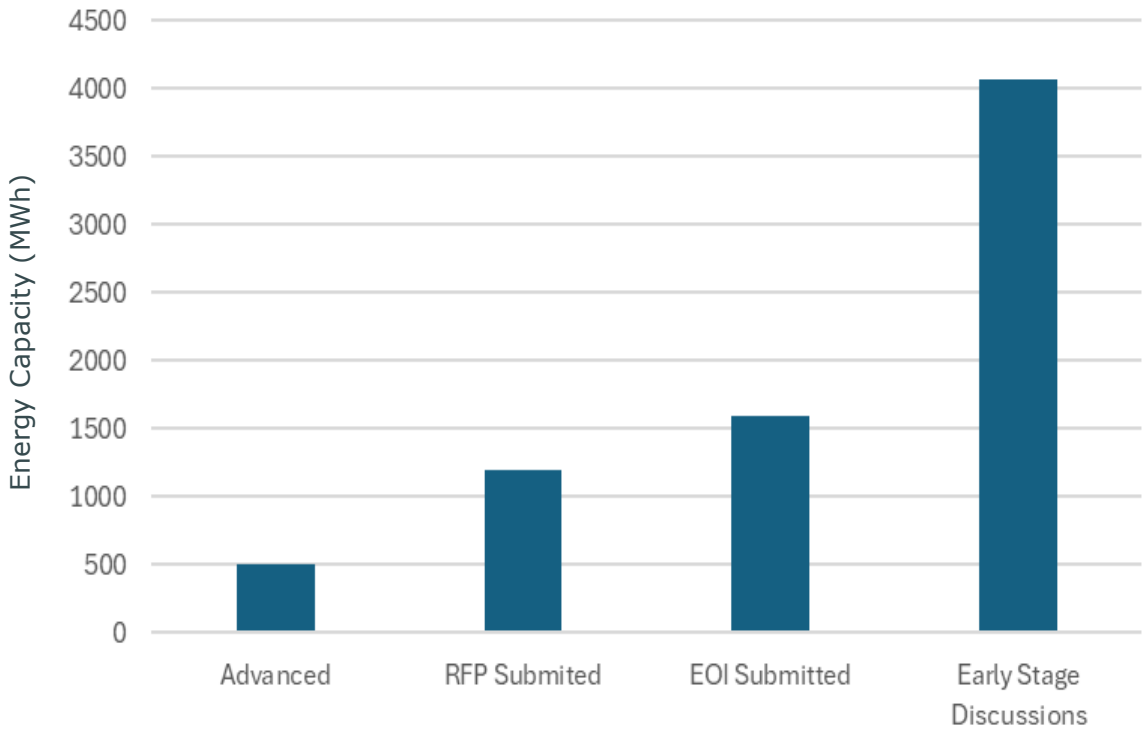
Company	Establishment year
akaysha	2021
Eku	2022
VALENT ENERGY	2024

Note: 1. Example operators are all currently utilising Lithium-ion solutions.

VSUN Energy

VSUN Energy is pursuing a deep pipeline of eleven potential opportunities across Australia at various stages

VSUN Energy project pipeline in MWh



Two standout projects highlight the quality and conviction of initiatives VSUN Energy is targeting in its pipeline

1 Kalgoorlie 50MW/500MWh VFB

Western Australia-made 50MW 10-hour vanadium battery in Kalgoorlie to reinforce the Goldfields energy system with proposed $150m support from the WA Government. This is likely to be a competitive tender process. This investment commitment by the WA Government in vanadium demonstrates increasing awareness and adoption by governments and its applicability to energy security

2 Melbourne Renewable Energy Hub (MREH-B)

VSUN Energy was invited by Equis to submit a proposal via an EOI for deploying a VFB at MREH-B. The MREH-B is assessing alternative storage technologies such as VFBs, positioning VSUN Energy to fill this requirement

VSUN Energy

An investment in VSUN Energy is an investment in Australia's energy transition through an innovative and local organisation

vsun energy

AVL is seeking to raise growth capital of up to **A$25M** for its VSUN Energy business in return for **a significant stake** in the **VSUN Energy long-duration energy storage platform** providing direct deployment into a **high conviction project pipeline**

Finalise detailed design

Investment decision: 2025

Utilises proven low-risk cell stack technology with secured providers and early contractor involvement including:

cellcube

SEDGMAN

GENUS

Deploy into project pipeline

~11 projects including:

1. **Kalgoorlie 50MW/500MWh VFB**
2. **Melbourne Renewable Energy Hub-B 120MW/1200MWh**

Strong government support

AVL's vertical integration strategy aligns with government policy around energy transition, Future Made in Australia and China decoupling

Australian Federal government support

- AVL has been awarded a A$49M Federal government grant, of which it has received A$24.5M grant to date. This is in addition to the A$3.7M grant to help build AVL's vanadium electrolyte plant
- The enables AVL to pursue opportunities to minimise project execution risks through enhanced project definition, such as full detailed engineering of key infrastructure and project approvals
- AVL will continue to engage with State and Federal funding agencies such as NAIF, ARENA, CEFC and National Reconstruction Fund Corporation to maximise utilisation of government and grant funding for the development of critical minerals and clean energy projects

WA State government support

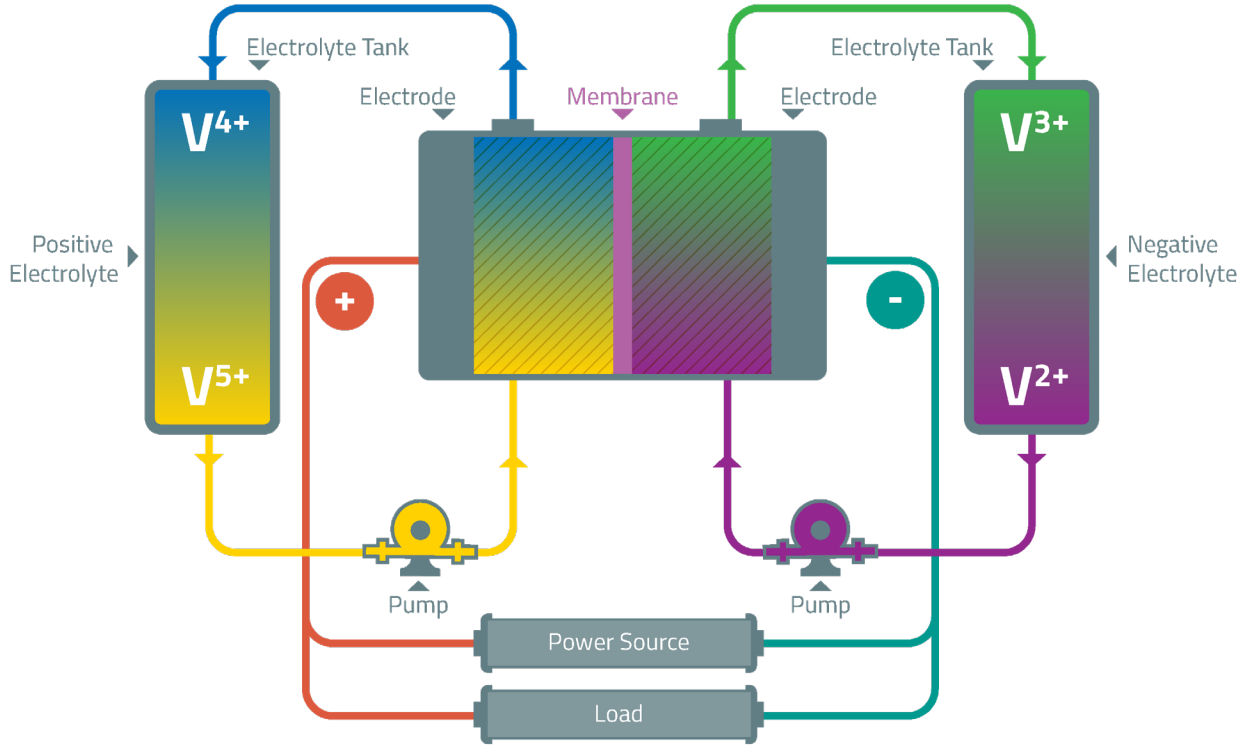
- Committed to invest A$150M in a WA-made VFB to reinforce the Goldfields energy system, a state-significant city and industrial hub. This is likely to be a competitive tender process
- Royalty of 2.5% on vanadium products (previously 5% on some products) and maintained a nil royalty on vanadium electrolyte
- AVL's Australian Vanadium Project recently secured Green Energy Major Project status from the WA Government
- AVL recently secured EPA approval for the Gabanintha Vanadium Project which forms part of the Australian Vanadium Project

LHS: CEO Graham Arvidson and The Hon Anthony Albanese MP, Prime Minister of Australia, RHS: The Hon Roger Cook MLA, Premier of Western Australia at AVL's electrolyte facility

Appendices

What is a vanadium flow battery?

- A **VFB** is made up of two tanks filled with **vanadium electrolyte** fluid
- The electrolyte acts as cathode and anode, tank size determines capacity
- Vanadium electrolyte contains **145g** of high-purity V_2O_5 per litre
- Invented over 40 years ago and commercialised at very large scale
- Economic: offers compelling cost of storage vs. Li-BESS for long-duration energy storage applications (>4 hours)
- The cost-competitiveness, long-duration nature and the unique attributes of VFBs make them well suited for:
  - Energy storage solutions at remote mining or industrial sites
  - Behind the meter industrial customers
  - Grid scale deployments
  - Energy storage solutions for data centres (non-flammable)



Contact

To learn more about Australian Vanadium or to discuss the potential investment options outlined in this paper, please contact:

Mr. Tom Plant

Chief Financial Officer
M: +61 408 226 355
E: tom.plant@avl.au