



Silica Sand

*Essential to World Growth*



RESOURCE CONNECT **ASIA**

**TRIBECA FUTURE FACING  
COMMODITIES CONFERENCE**

**SINGAPORE 2025**

**April 2025**



**VRXSILICA**

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## Compliance Statement

The information in this document that relates to the estimation and reporting of the Mineral Resource and Ore Reserves for the Company’s silica sand projects is extracted from releases to ASX on 28 August 2019, 11 November 2022 and 6 March 2024 (Arrowsmith North), 17 September 2019 (Arrowsmith Central), 9 May 2023 (Arrowsmith Brand), 18 October 2019 (Muchea) and Boyatup (18 August 2022). The Company confirms that it is not aware of any new information or data that materially affects the information included in this document and all material assumptions and technical parameters underpinning the estimates continue to apply and have not materially changed. The Company confirms that the form and context in which the Competent Persons’ findings are presented have not been materially modified from the original market announcements.

The Company confirms that all the material assumptions underpinning the production target, or the forecast financial information derived from the production target, in the initial public report (6 March 2024) continue to apply and have not materially changed.

# Silica Sand: The Second-most Consumed Material on Earth







VRX SILICA

# The world is facing a global sand supply crisis

News ▾ Middle East Documentaries ▾ Shows ▾ Investigations

FEATURE / BUSINESS & ECONOMY

## Running out of sand: in numbers

*We illustrate the depletion of one the world's most sought-after commodities of the 21st century: sand.*

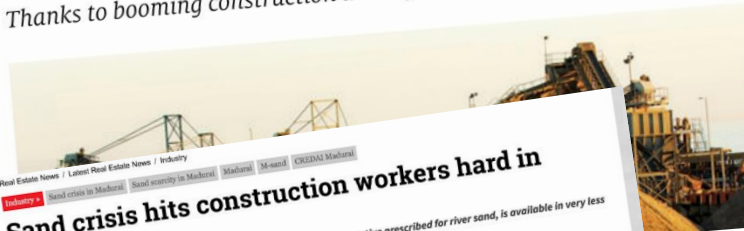
### Demand for sand leads to global ecological crisis

by Alexandra Popescu on 8 February 2018

A shore thing

## An improbable global shortage: sand

Thanks to booming construction activity in Asia, sand is in high demand



Real Estate News / Latest Real Estate News / Industry

### Sand crisis hits construction workers hard in Madurai

What has made things worse is that M-sand (manufactured sand), the alternative prescribed for river sand, is available in very less quantity and its quality is also far from desirable.

TNN | January 23, 2018, 12:00 IST

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## The world is facing a global sand crisis

September 8, 2017 6:22am AEST

Sand for use in hydraulic fracturing operations at a processing plant in Chippewa Falls, Wisconsin in 2011. AP Photo/Steve Karnowski, Author provided

When people picture sand spread across idyllic beaches and endless deserts, they understandably think of it as an infinite resource. But as we discuss in a [just-published perspective](#) in the journal Science, over-exploitation of global supplies of sand is damaging the environment, endangering communities, causing shortages and promoting violent conflict.

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TOPIC BELT AND ROAD INITIATIVE

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## THE WORLD IS RUNNING OUT OF A RESOURCE, AND IT'S NOT OIL

A looming shortage of sand – a crucial resource once thought endless – could sink infrastructure projects, including those in China's Belt and Road Initiative

## Global Shortage of Key Resource Could Doom Key Asian Infrastructure Projects

ENVIRONMENT 03:40 07.01.2018 (updated 07:18 07.01.2018) [Get short URL](#)

6 11 0

In the city of Kampot in southern Cambodia, the extraction of sand from an estuary on the Praek Tuek Chhu river is increasing and sand extraction is so common in Asia currently that the continent may deplete all of its sand in the not-too-distant future.

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Unchecked sand mining with

## Project development pipeline to ensure disciplined, staged development of world-class assets



- ❑ Five very large scale, high grade and low impurity silica sand projects each project capable of independent operation to supply processed material to diverse markets
- ❑ Simple, low impact mining and processing
- ❑ Access to established infrastructure (logistics, power, water and gas)
  - rail lines to port run adjacent to all project tenements
  - gas pipelines run adjacent to each of the project areas
- ❑ Scale of projects provides long-term opportunity for silica sand export and potential glass manufacturing and downstream industries in Western Australia
- ❑ Grant of geothermal permit in the Mid West and JV with Steam Resources provides alternative energy solution

# Market Outlook - Foundry Sand

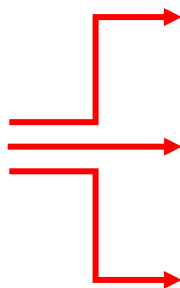
## *VRX Target Market - Metal Casting/Foundry for Automobile Parts*

### *Arrowsmith North silica sand project Foundry Sand products*

Used for moulding sand and core sand for non-ferrous alloy castings, iron castings and small steel castings.

Increasing demand for high-performance and high-quality castings in automobile, railway transportation, aerospace and other industries. The market demand scale of casting products continues to grow, and the demand for casting sand continues to expand. Recent advances in sand media for 3D printing of intricate moulds.

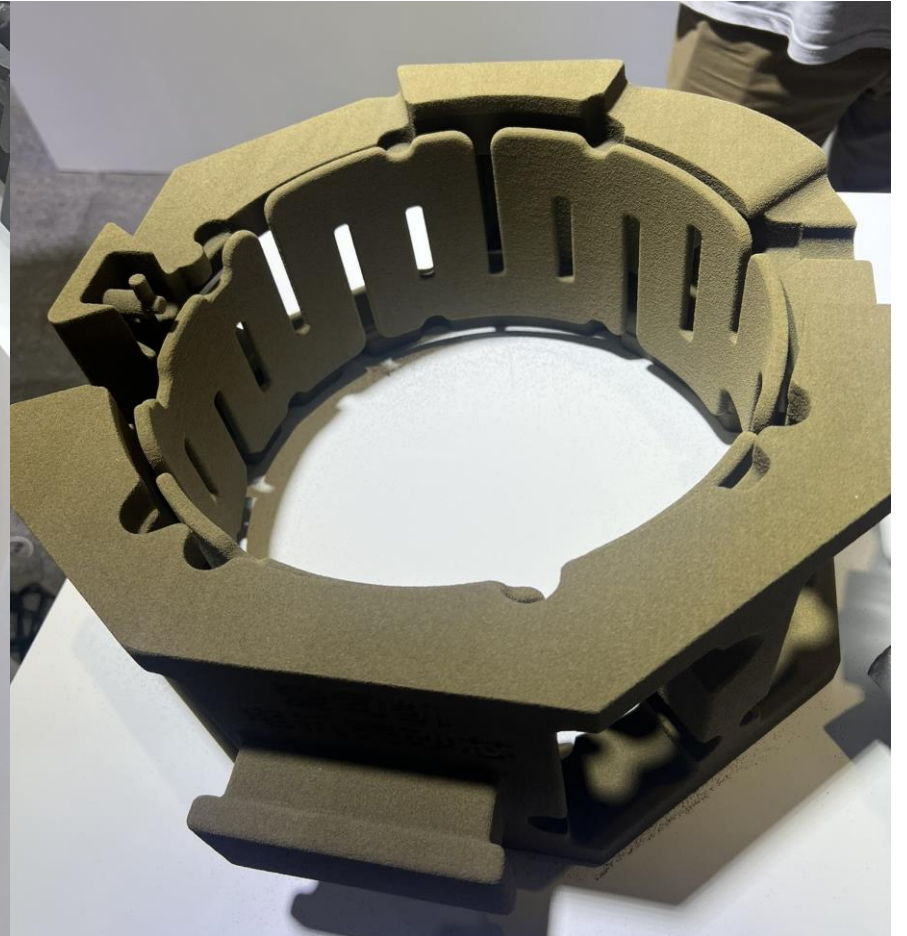
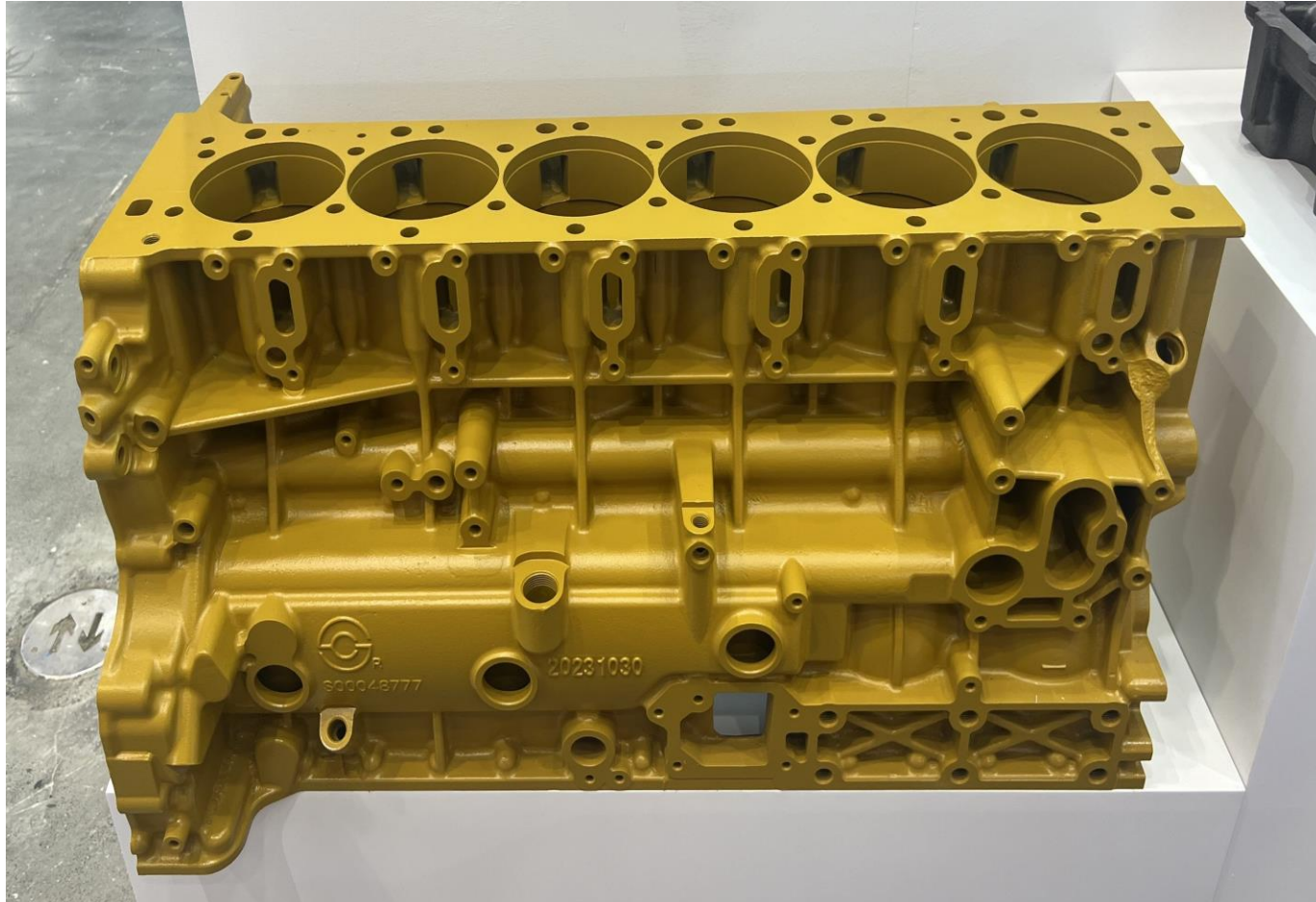
**VRX's  
Production  
Market**



Country	Volume (Million t)	Market Value (USD Million)	Growth	Key Industries
South Korea	1.5-2	90	2-3%	Automotive, steel
Japan	3.5-4	270	3-4%	Automotive, high-end machinery
China	11-12	810	3-5%	Automotive, steel, electronics, 3D media



# Metal Casting Media New Industry 3D Printing Intricate Patterns



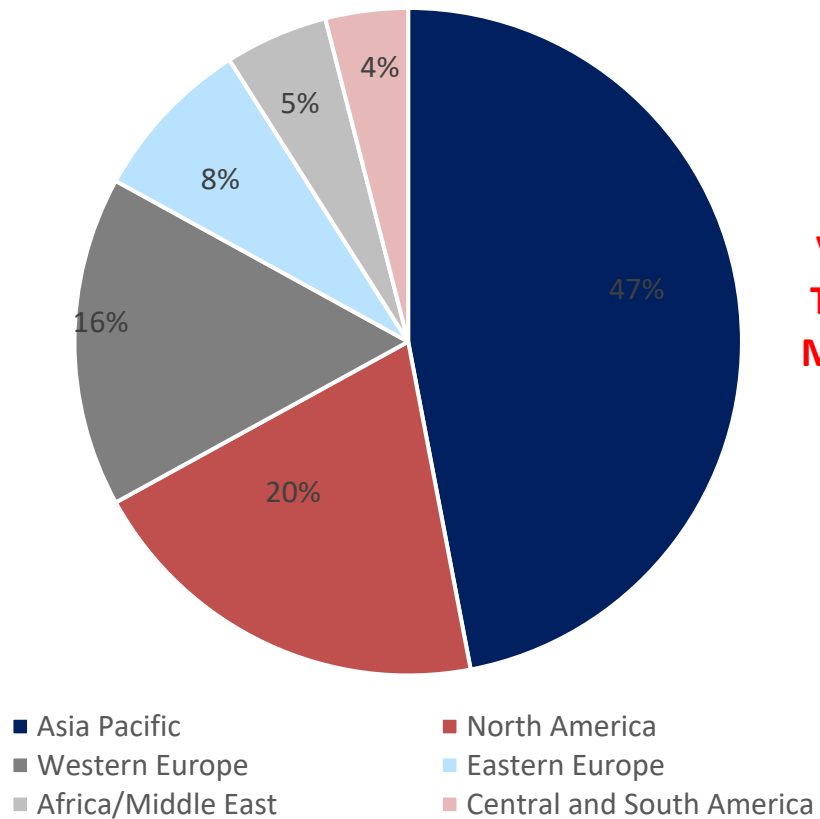


# Market Outlook - Glassmaking

*Asian glass making production increasing 5-6% per year (~8 - 10Mtpa Growth)*

*VRX Target Market - Float, Container*

Glassmaking silica sand demand by region\*



VRX's  
Target  
Market

Use	Spec	Market in Asia	Growth in Asia
Float (Plate) Glass	99.5% SiO <sub>2</sub>	60 - 65Mt	5% - 6%
Container Glass	99.5% SiO <sub>2</sub>	70 - 75Mt	5% - 6%

\*Source: Freedonia estimate



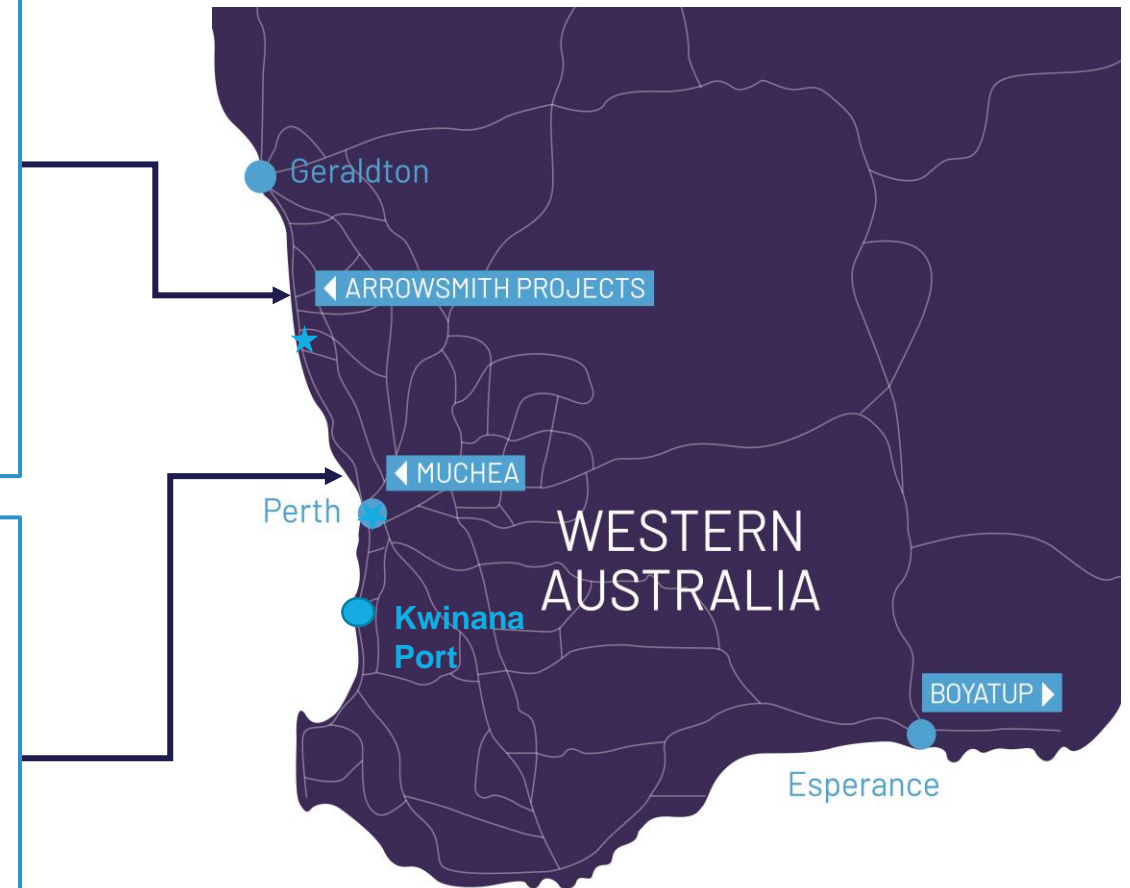


## Arrowsmith North (100%)

- High-grade with exceptional financial metrics
- Close proximity to port and rail infrastructure
- Glass making and foundry products
- Potential +100 year mine life:
  - JORC Proved and Probable Reserve of
  - **221Mt @ 99.5% SiO<sub>2</sub>**
- Updated BFS completed March 2024
- Environmental and mining approvals expected Q2 2025
- Final offtakes and financing to follow

## Muchea (100%)

- Very **high-grade** product with outstanding financial metrics
- Well located to key port and rail infrastructure
- Specialist solar panel glass products
- Potential +100 year mine life:
  - JORC Indicated and Inferred Resource
  - **208Mt @ 99.6% SiO<sub>2</sub>**
- BFS completed Oct 2019





# Arrowsmith North Silica Sand Project

Project Site  
Vegetation Kwongan Heath  
Loose sand/shallow root systems suitable for VDT





## **Near-term development opportunity for a world-class silica sand project**

- ❑ Production expected to commence 8-12 months following final environmental approvals, finance and FID
- ❑ 221Mt Ore Reserve @99.5% SiO<sub>2</sub> (100-year production) (See Reserve Table)
- ❑ Grade controlled Proved Ore Reserve 9.2Mt for first 6 years of production
- ❑ Tailored 2Mtpa processing plant with patented process circuit, final capital estimate and independent technical review nearing finalisation
- ❑ Access to established infrastructure –
  - ❑ Established bore for water from Yarragadee North deep aquifer
  - ❑ Access by adjacent Brand Highway
  - ❑ Potential hybrid gas and solar power supply

## Environmental and Mining Approvals Nearing Completion

- ☐ Original Referrals to Commonwealth and State environmental agencies late 2020
- ☐ Confirmation by Commonwealth of accredited State assessment under the EPBC Act
- ☐ Approvals for Mining, Works and Water lodged 2022
- ☐ EPA public review and response to submissions 2023-2024
- ☐ Final EPA report, recommendation to Minister and proposed approval conditions Jan 2025
- ☐ Awaiting final Ministerial consent following completion of appeals process, expected April 2025
- ☐ Commonwealth and other approvals expected Q2 2025



## Independent Technical Review Underway

- ❑ Updated BFS (March 2024) demonstrates robust financial metrics for a World-class silica sand project
- ❑ Ungeared NPV<sub>10</sub> of \$167m based on 25 years mining of a +100 year Reserve
- ❑ Proved and Probable Ore Reserve of 221Mt @ 99.5% SiO<sub>2</sub>
- ❑ Four products for international foundry and glassmaking industries
- ❑ Independent technical review by AMC Consultants to support financing nearing finalisation

# Unique Mining

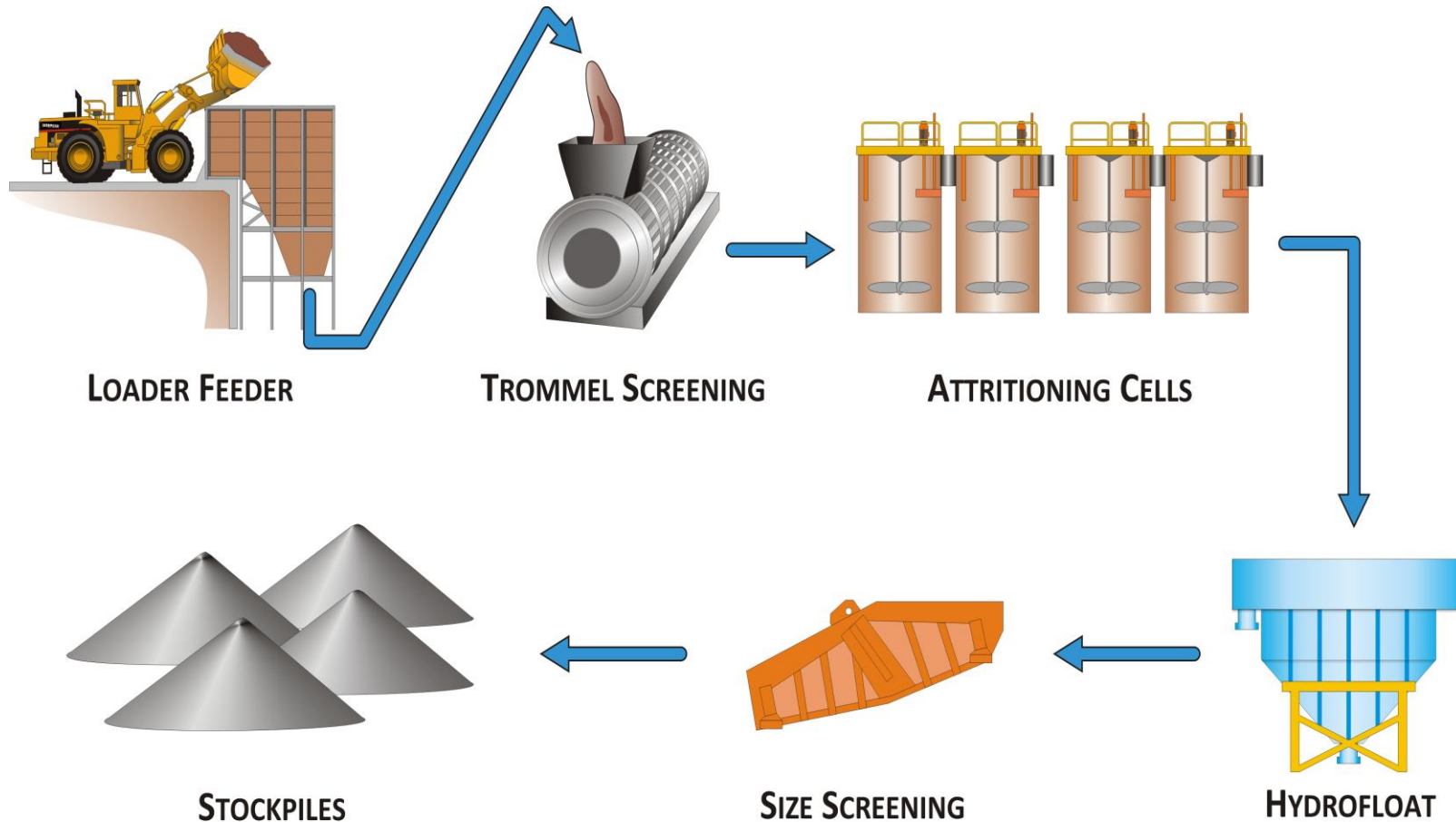
**A made-for-purpose mining method designed around continuous rehabilitation**

- ❑ VRX has developed a unique and continuous rehabilitation silica sand mining method
- ❑ The Vegetation Direct Transfer (VDT) method provides a rapid and comprehensive regeneration of mined areas
- ❑ Removes a 400mm-deep sod with topsoil containing the topsoil and native flora remaining intact
- ❑ Root structures in the loose sand are relatively shallow at 200-300mm in depth
- ❑ Modified loader bucket required for VDT fabricated and ready for use



# Processing Flowsheet

**Simplified wet processing, multiple products, no dust, 2mtpa processing plant at each site**



## Processing Plant Design



- Arrowsmith North, Arrowsmith Central and Muchea to each have 2 Mtpa processing capacity
- No toxic reagents required



# Processing Plant Design



**No dust**  
**No toxic chemicals**



# Muchea Silica Sand Project Site

Vegetation: Banksia Woodland  
Low grasses and sedges suitable for VDT



## Large scale, world class high-grade and low impurity silica sand project

- ❑ Production to follow Arrowsmith North subject to EPA approval
- ❑ Utilise VDT and duplicate plant
- ❑ Access to established infrastructure
  - ❑ Underutilised railway connects to Kwinana (100km)
  - ❑ Grid power
  - ❑ Water from Yaragadee deep aquifer
  - ❑ Adjacent to Brand Highway
- ❑ Granted Mining Lease and Miscellaneous Licences for access
- ❑ Significant metallurgical testwork **+99.9% SiO<sub>2</sub> - <100ppm Fe<sub>2</sub>O<sub>3</sub>** after processing (high-grade, low impurity)

## Downstream processing capabilities

- ❑ Critical Minerals Prospectus – VRX Muchea project is included in the 2024 Critical Minerals Prospectus published by Austrade (now online)
- ❑ Raw material for premium ultra-clear cover glass production for solar panels
- ❑ Potential for production of solar panels in Western Australia
- ❑ Potential for production of silica flour for LCDs and other applications
- ❑ IAF Grant - VRX has received a grant from the Western Australian Innovation Attraction Fund to investigate the production of silica flour:
  - ❑ 1 tonne sample successfully tested by specialist laboratory in Germany
  - ❑ Samples despatched to potential buyers
  - ❑ Significant interest in products capable of production

# Sustainability, Environment, Social and Governance (ESG)

VRX is delivering on its ESG responsibilities aligned to the UN's Sustainable Development Goals

## SUSTAINABLE DEVELOPMENT GOALS



### CLEAN ENERGY

Utilising reliable, renewable modern energy



### ECONOMIC GROWTH

Enhancing economic and productive employment



### INDUSTRY INNOVATION

Building resilient infrastructure and fostering innovation



### SUSTAINABLE COMMUNITIES

Respecting heritage values



### RESPONSIBLE PRODUCTION

Employing sustainable mining methods



### CLIMATE ACTION

Reducing emissions from production



### REHABILITATION PLAN

Employing direct vegetation transfer as a unique rehabilitation method



# Corporate Summary



## Capital Structure

Share Price	A\$0.046*
Ordinary Shares on Issue	747 million
Options on Issue	92 million
Market Capitalisation	A\$34 million*
Cash	A\$4.8 million**
Debt	Nil
Enterprise Value	A\$29.2 million

## Shareholders

Board and Management	10%
Top 20 Total	37%

\* Closing share price on ASX on 31 March 2025

\*\* Cash at 31 March 2025

# Our Team

## Board

Person	Role	Experience
<b>Paul Boyatzis</b>	Chairman	Governance: over 30 years' experience in investment, equity markets and managing public companies
<b>Bruce Maluish</b>	Managing Director	Technical and finance: over 40 years' experience in mining industry including previous roles as ASX MD and General Manager
<b>Peter Pawlowitsch</b>	Non-Executive Director	Senior executive: finance and corporate roles
<b>David Welch</b>	Non-Executive Director	Senior executive: responsible for strategy, business transformation and performance, commercial negotiations

## Executive

Person	Role	Experience
<b>Ryan Baxter</b>	General Manager	Production: 15 years' experience in mining and construction with 10 years exporting silica sand
<b>David Reid</b>	Exploration Manager	Technical: responsible for exploration and mineral processing
<b>Steven Papadopoulos</b>	Commercial Manager	Legal and commercial: over 25 years' experience as corporate lawyer and commercial advisor in resources and other industries
<b>Yoonil Kim</b>	Marketing Manager	Marketing: 19 years' experience selling silica sand in the Asian market

### Opportunity for WA to capture an economic advantage of abundant silica sand and domestic gas reserves to build world-class glass manufacturing and downstream processing industries

- ❑ Very long life, high-grade silica sand supply with combined 1.4 billion tonne Resource, 99.6% to 96.5% SiO<sub>2</sub> grade
- ❑ Arrowsmith North environmental and other approvals expected Q1 2025
- ❑ WA domestic gas reserves and burgeoning hydrogen projects in mid-west, with exposure to geothermal energy solutions
- ❑ Long term supply of essential raw materials and potential **green** energy for **glass** manufacturing (LNG gas/wind/solar/hydrogen)
- ❑ High-tech ultra-clear glass and HPQ production capability from Muchea
- ❑ Manufacturing of solar panels in WA for a huge and growing market in Australasia

# Thank you

## Bruce Maluish

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# Silica Sand Resources and Reserves

## Mineral Resources - as at 30/06/2024

Project	Classification	Mt	SiO <sub>2</sub> %	Al <sub>2</sub> O <sub>3</sub> %	Fe <sub>2</sub> O <sub>3</sub> %	TiO <sub>2</sub> %	LOI %
Mucua	Indicated	29	99.6	0.1	0.03	0.1	0.2
	Inferred	179	99.6	0.1	0.02	0.1	0.2
	<b>Total</b>	<b>208</b>	<b>99.6</b>	<b>0.1</b>	<b>0.02</b>	<b>0.1</b>	<b>0.2</b>
Arrowsmith North	Measured	10	95.9	1.9	0.7	0.3	0.7
	Indicated	237	97.7	1.0	0.4	0.2	0.5
	Inferred	266	98.4	0.7	0.3	0.2	0.4
	<b>Total</b>	<b>513</b>	<b>98.0</b>	<b>0.9</b>	<b>0.3</b>	<b>0.2</b>	<b>0.4</b>
Arrowsmith Brand	Inferred	523	97.3	1.4	0.4	0.2	0.6
	<b>Total</b>	<b>523</b>	<b>97.3</b>	<b>1.4</b>	<b>0.4</b>	<b>0.2</b>	<b>0.6</b>
Arrowsmith Central	Indicated	28.2	96.6	1.7	0.4	0.2	0.7
	Inferred	48.3	96.9	1.5	0.4	0.2	0.7
	<b>Total</b>	<b>76.5</b>	<b>96.8</b>	<b>1.5</b>	<b>0.4</b>	<b>0.2</b>	<b>0.7</b>
Boyatup	Inferred	60	97.8	0.8	0.2	0.1	0.9
	<b>Total</b>	<b>60</b>	<b>97.8</b>	<b>0.8</b>	<b>0.2</b>	<b>0.1</b>	<b>0.9</b>

**Total Mineral Resource 1,381 Million Tonnes**

## Ore Reserves - as at 30/06/2024

Project	Classification	Product	Mt	SiO <sub>2</sub> %	Al <sub>2</sub> O <sub>3</sub> %	Fe <sub>2</sub> O <sub>3</sub> %	TiO <sub>2</sub> %	LOI %
Muchea	Probable	F80	10.2	99.9	0.02	0.008	0.03	0.1
		F80C	4.25					
		F150	4.25	99.8	0.07	0.015	0.035	0.1
Muchea Ore Reserve			18.7	Million Tonnes				
Arrowsmith North	Proved	AFS20	0.8	99.5	0.25	0.07	0.05	0.1
		AFS35	3.9	99.5	0.5	0.06	0.05	0.1
		AFS55	2.7	99.2	0.5	0.1	0.05	0.1
		Local	1.8					
	Proved Ore Reserve		9.2	Million Tonnes				
	Probable	AFS20	24.2	99.5	0.25	0.07	0.05	0.1
		AFS35	102.5	99.5	0.5	0.06	0.05	0.1
		AFS55	51.1	99.2	0.5	0.1	0.05	0.1
		Local	34.1					
Probable Ore Reserve		212	Million Tonnes					
Arrowsmith North Ore Reserve			221	Million Tonnes				
Arrowsmith Central	Probable	CF400	4.2	99.6	0.25	0.04	0.03	0.1
		C20	8.4					
		C40	4.2					
		High TiO <sub>2</sub>	2.2			<1%	2%	
Arrowsmith Central Ore Reserve			18.9	Million Tonnes				

**Total Ore Reserve 259 Million Tonnes**