



Silica Sand Essential to world growth

Market Update

January 2020





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The information in this report that relates to Exploration Results is based on data collected and compiled under the supervision of Mr David Reid, who is a full time employee of VRX Silica. Mr Reid, BSc (Geology), is a registered member of the Australian Institute of Geoscientists and has sufficient experience that is relevant to the style of mineralisation and type of deposit under consideration and the activity being undertaken to qualify as a Competent Person under the 2012 edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (JORC Code). Mr Reid consents to the inclusion of the data in the form and context in which it appears.

The information in this report that relates to Mineral Resources is based on information compiled by Mr Grant Louw who is a full-time employee of CSA Global, under the direction and supervision of Dr Andrew Scogings, who is an Associate of CSA Global. Dr Scogings is a Member of the Australasian Institute of Mining and Metallurgy and a Member of the Australian Institute of Geoscientists. He is a Registered Professional Geologist in Industrial Minerals. Dr Scogings has sufficient experience relevant to the style of mineralisation and type of deposit under consideration and to the activity which he is undertaking to qualify as Competent Person as defined in the 2012 edition of the Australasian Code for the Reporting of Exploration Results, Mineral Resources, and Ore Reserves (JORC Code). Dr Scogings consents to the disclosure of information in this report in the form and context in which it appears.

The information in this report that relates to the Ore Reserves is based on data collected and compiled under the supervision of Mr David Reid, who is a full time employee of VRX Silica. Mr Reid, BSc (Geology), is a registered member of the Australian Institute of Geoscientists and has sufficient experience that is relevant to the style of mineralisation and type of deposit under consideration and the activity being undertaken to qualify as a Competent Person under the 2012 edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (JORC Code). Mr Reid consents to the inclusion of the data in the form and context in which it appears.



*“Sand is the main material
that modern cities are made of”*

Vince Beiser

“The World in a Grain” 2018

The story of sand and how it
transformed Civilisation

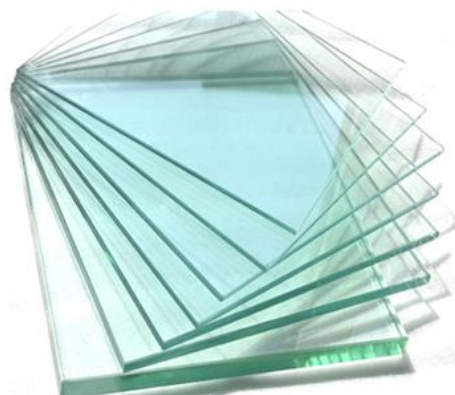




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Silica Sand

Silica sand has continued to support human progress throughout history, being a key raw material in the industrial development of the world, especially in the glass, metal casting and ceramics industries.



Supplies of sand are running out!





The world is facing a global sand crisis



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Silica Sand Use

Construction Sand	Concrete
Glassmaking	Flat, Containers, Architectural, Thin Film
Metal Casting/Foundry	Automobile parts
Oil/Gas Well Stimulation	Frac sand/proppant
Metallurgical	Ferrous and Non-ferrous Alloys
Paint and Coatings	Brightness and durability
Chemical Production	Sodium silicate, Silicon gels
Ceramics and Refractories	High temp resistance
Filtration	Water production
Agricultural/Recreational	Inert growing media, Golf bunkers

Target market



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For personal use only

*“Sand is the essential ingredient
that makes modern life possible”*

Vince Beiser

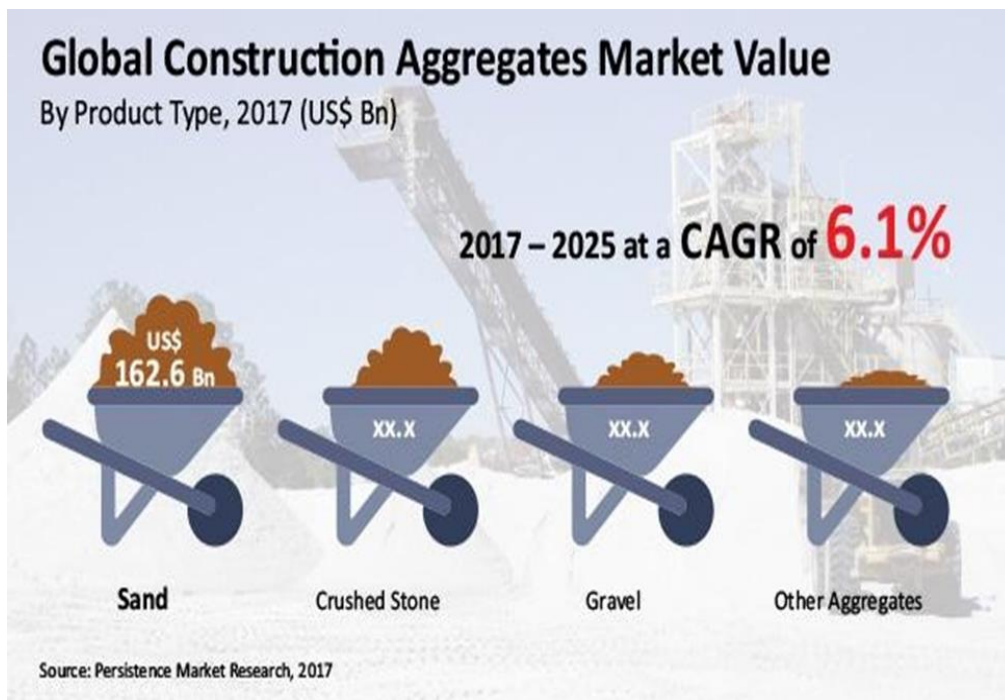
“The World in a Grain” 2018

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Construction Market

China and India will remain major markets for construction materials, mainly due to the growth of the building sector in these two countries.

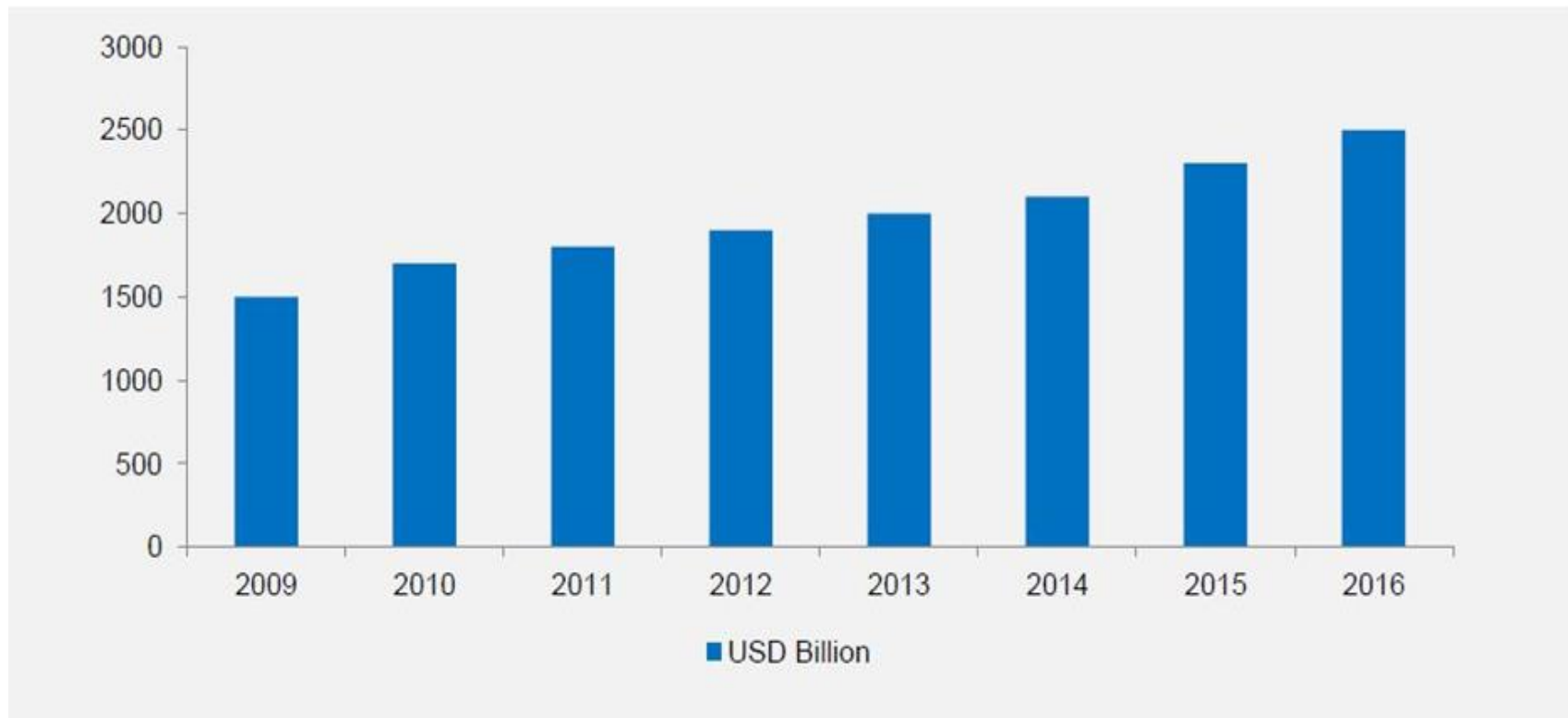
City construction needs glass!





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Construction Market

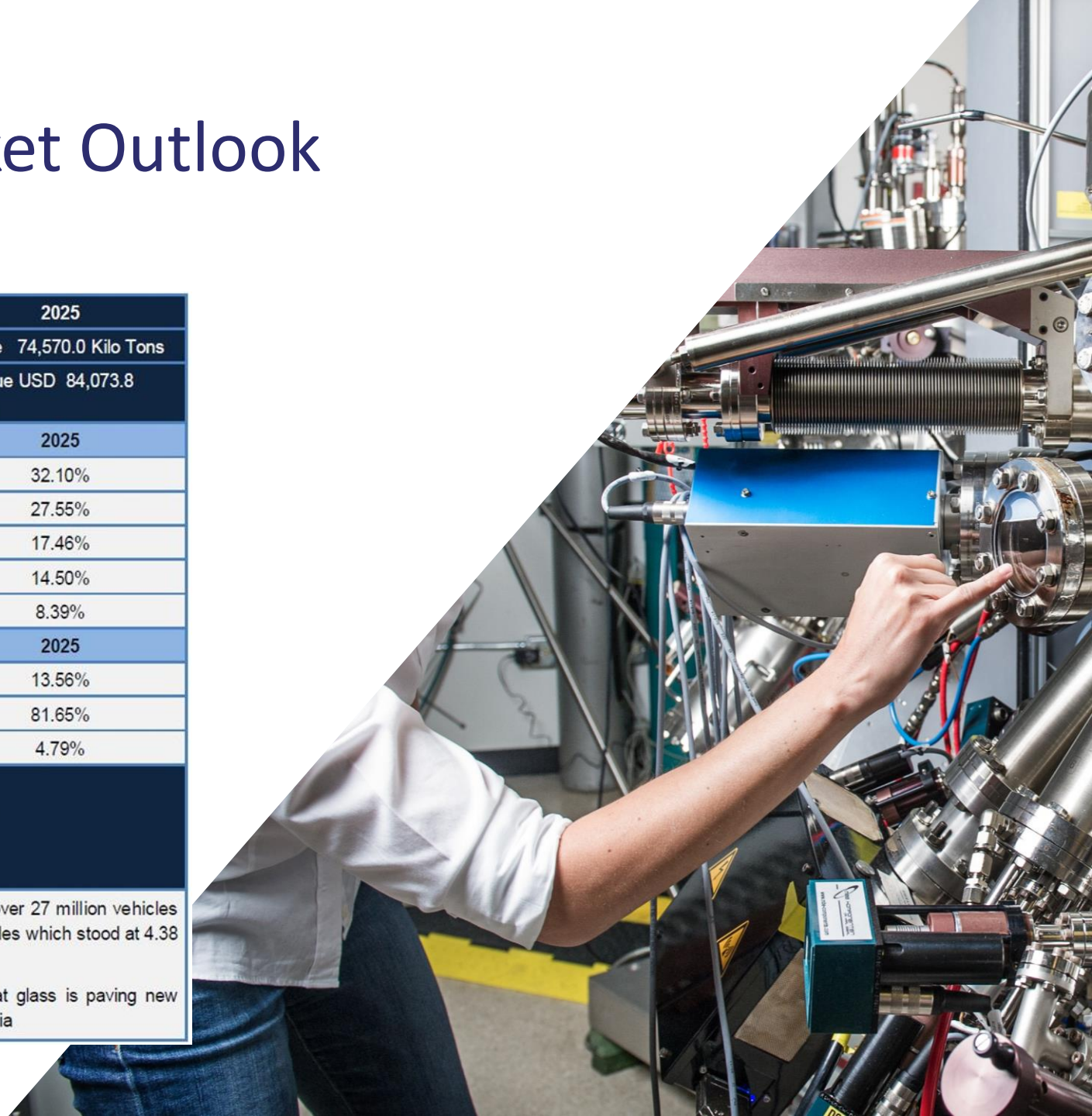


Total Investment in Infrastructure
in Asia Pacific


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Flat Glass Market Outlook

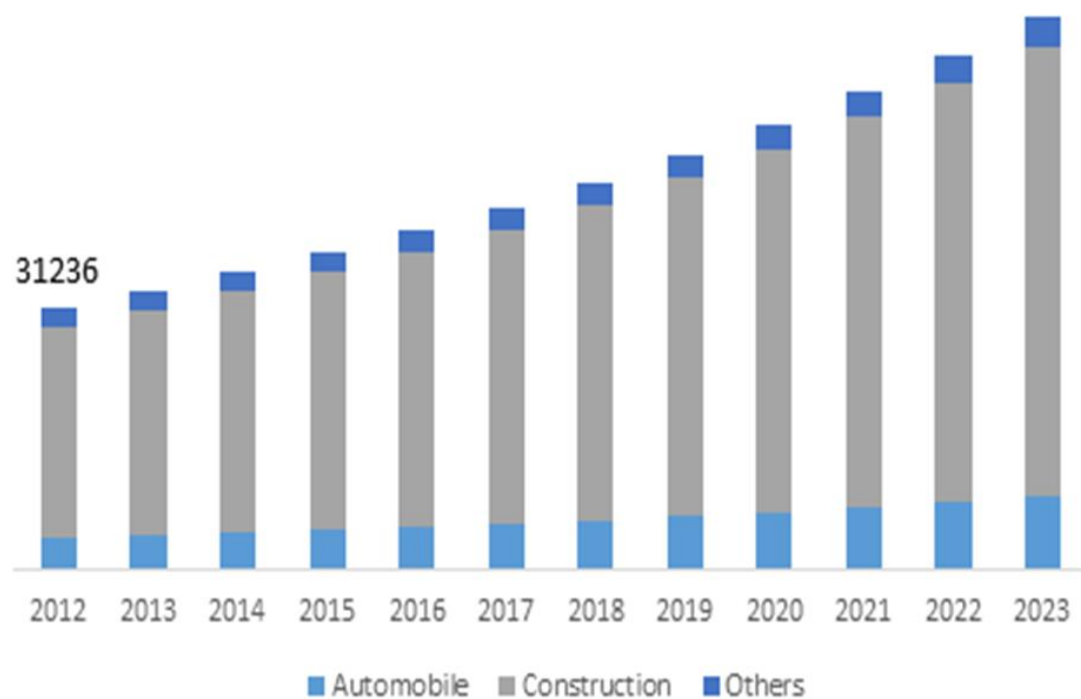
Market size 2014 – 2025 (ASIA PACIFIC)	2014	2018	2025
	Volume 41,639.5 Kilo Tons	Volume 51,466.7 Kilo Tons	Volume 74,570.0 Kilo Tons
	Revenue USD 40,598.9 Billion	Revenue USD 54,420.2 Billion	Revenue USD 84,073.8 Billion
Market product size	Product	2018	2025
	Tempered	31.05%	32.10%
	Laminated	26.85%	27.55%
	Basic Float	18.65%	17.46%
	Insulating	13.87%	14.50%
	Others	9.58%	8.39%
Market application size	Application	2018	2025
	Automobile	12.72%	13.56%
	Construction	81.30%	81.65%
	Others	5.98%	4.79%
Market drivers	<ul style="list-style-type: none"> Growth in building and construction industry in developing countries Positive automotive industry outlook in Asia Pacific 		
Potential growth opportunities	<ul style="list-style-type: none"> China Association of Automobile Manufacturers, reported a sale of over 27 million vehicles in 2018. This includes a rise of 5.05% in the sale of commercial vehicles which stood at 4.38 million. Solar Energy sector, which is one of the demanding market for flat glass is paving new opportunities for the glass manufacturers particularly in China and India 		





Flat Glass Market Outlook - China

China Flat Glass Market size, by application, 2013-2023 (Kilo Tons)



The APAC flat glass market is experiencing high growth because of increased demand from the construction and automotive sectors.

The glass industry is a major driver for the global silica sand mining market





Chinese Automobile Production



China produced 27 million vehicles in 2018!





“Humans are estimated to consume nearly 50 billion tons of sand and gravel every year”

“World Construction Aggregates”, 2016





Glass Innovation

Gorilla Glass	Corning is manufacturing proprietary Gorilla Glass primarily for automobile applications. This glass enables weight reduction in more than 50% of glazing, compared to traditional soda lime glass. This is essential to reduce the weight of an automobile in order to meet strict emissions regulations. Corning manufactures Gorilla glass which is used in windshields, sidelights, backlights, sunroofs, and automotive interior panels.
LCD	Liquid Crystal Displays (LCD) are light modulators that require a light source to be viewed either backlit or lit from an external source. Flat glass is coated with a film which is brushed into a single filament. This technology requires twisted molecular chains, which change the flow of light through the medium to produce on or off pixels.
Thermochromic	Thermochromic Technology modulates the amount of light coming through the glass in response to changing environmental temperatures from sunlight exposure and also changes in wind velocity and air temperature.
ClearVue PV	Australian research company ClearVue PV has been working for years perfecting a technology that utilises clear glass to emulate a solar panel and generate power.
Infoverre	Asahi Glass Company (AGC) is developing a variety of new products for applications that include the infoverre™ WINDOW Series 9mm Clear Screen, encasing a transparent display between multi-paned glazing and can be used to display information.



VRX's three advanced WA Silica Sand Projects

Muchea (100%)

- Very high-grade product with outstanding financial metrics
- Well located to key port and rail infrastructure
- Specialist glass products
- Potential +100 year mine life:
 - JORC Resource **208Mt @ 99.6% SiO₂**
 - (Ind 29Mt @99.6% SiO₂; Inf 179Mt @ 99.6% SiO₂)
 - Probable Ore Reserve of **18.7Mt @ 99.9% SiO₂**
- BFS completed Oct 2019

Arrowsmith North (100%)

- High-grade with exceptional financial metrics
- Close proximity to port and rail infrastructure
- Glass making, foundry and ceramic markets
- Potential +100 year mine life:
 - JORC Resource of **771Mt @ 98% SiO₂**
 - (Ind 248Mt @ 97.7% SiO₂; Inf 523Mt @ 98.2% SiO₂)
 - Probable Ore Reserve of **223 Mt @ 99.7% SiO₂**
- BFS completed Aug 2019

Arrowsmith Central (100%)

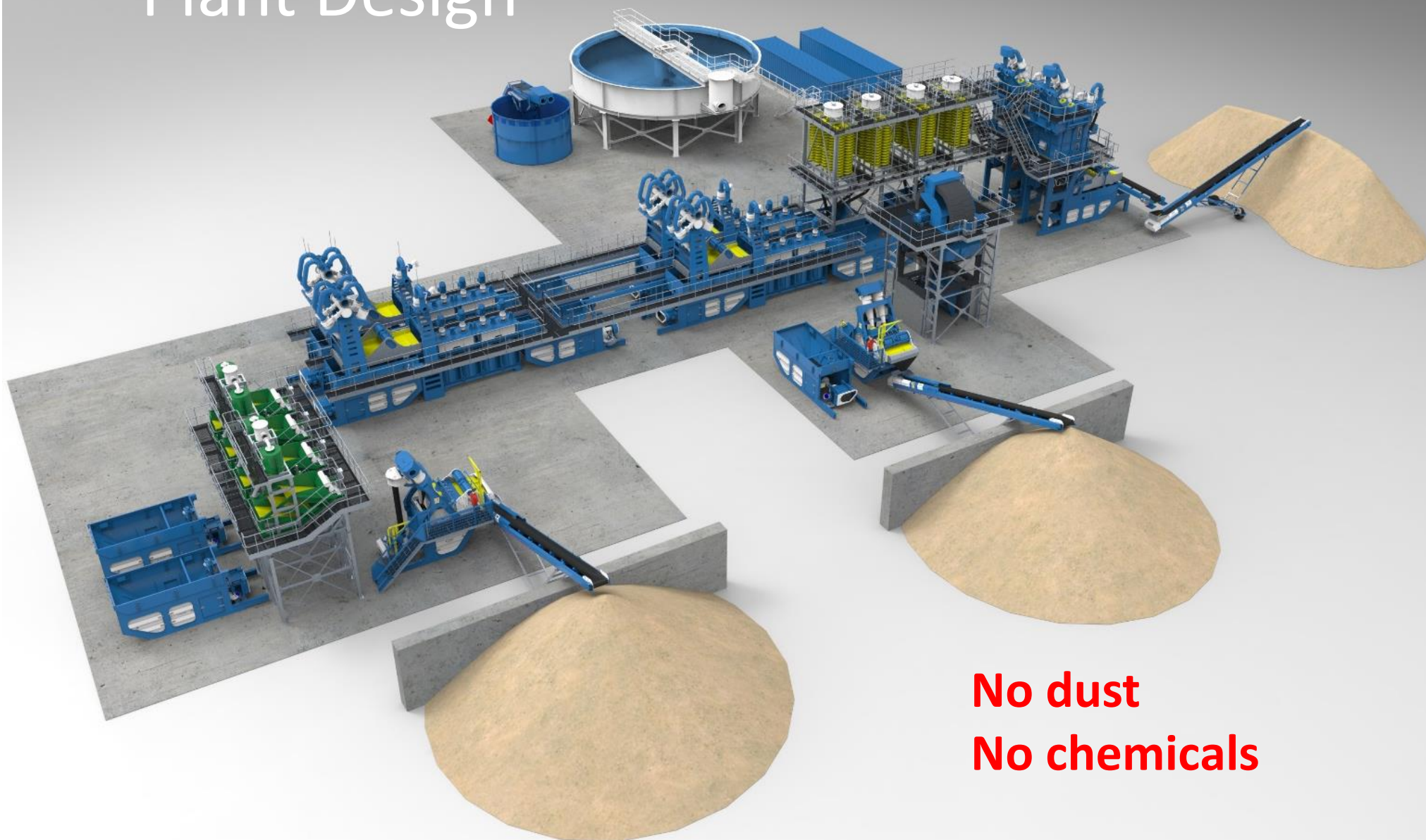
- High grade with strong financial metrics
- Adjacent to rail infrastructure to port
- Container glass and foundry products
- Significant resource base:
 - JORC Resource of **76.5 Mt @ 96.8% SiO₂**
 - (Ind 28.2Mt @ 96.6% SiO₂; Inf 48.3Mt @ 96.9% SiO₂)
 - Probable Ore Reserve of **18.9 Mt @ 99.6% SiO₂**
- BFS completed September 2019

Geraldton
Port

Kwinana
Port



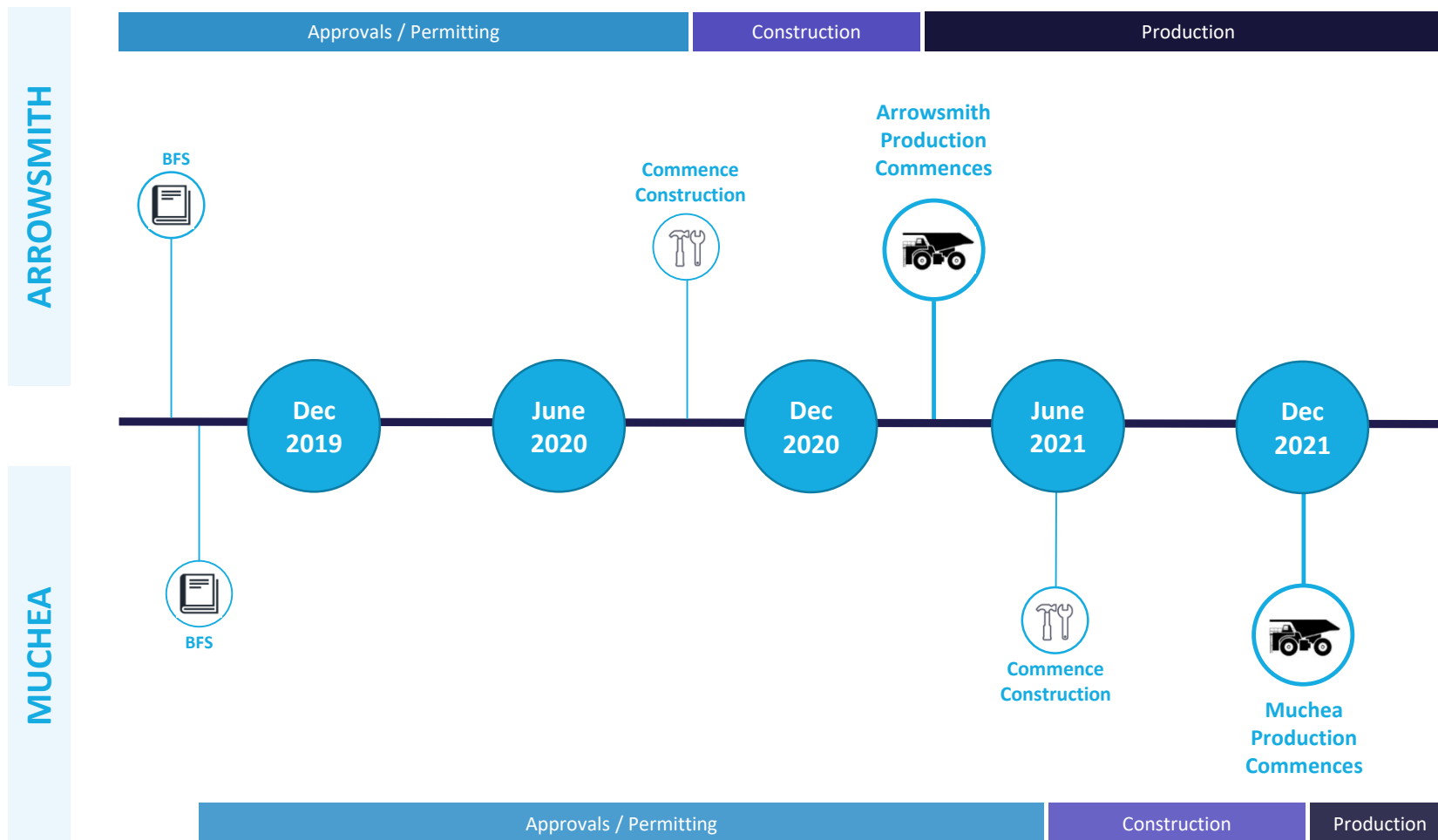
Processing Plant Design



No dust
No chemicals



Silica Sand Development Timeline



BFS's Demonstrate Exceptional Economics*

	Arrowsmith North	Arrowsmith Central	Muchea	Total
Post Tax, ungeared NPV ₁₀	\$242.3m	\$147.6m	\$337.9m	\$727.8m
Post Tax, ungeared IRR	79%	60%	96%	83%
Payback period (yrs) (post tax) (ramp up rate)	2.4	2.8	2.3	2.4
Exchange Rate US\$/A\$	\$0.70			
Life of Mine (yrs) (BFS Study)	25			
EBIT	\$1.144bn	\$737m	\$1.540bn	\$3.421bn
Total Sales (25 years) no escalation	\$2.773bn	\$2.167m	\$3.345bn	\$8.285bn
Cashflow after finance and tax	\$835m	\$539m	\$1.123bn	\$2.497bn
Capex (2 mtpa)	\$28.260m	\$25.88m	\$32.8m	\$87m
Capex contingency (inc)	20%			
Life of Mine C1 costs, FOB (inc Royalties)	\$30.18	\$27.67	\$32.74	\$30.24
Tonnes Processed (million tonnes) (BFS Study)	53	51	54	158

* Full details of the bankable feasibility studies for the Arrowsmith North, Arrowsmith Central and Muchea projects, including material assumptions underpinning production targets and forecast financial information, are contained in VRX's ASX announcements of 28 August 2019, 17 September 2019 and 18 October 2019, respectively. All such material assumptions continue to apply and have not materially changed. Whilst VRX considers all of the material assumptions to be based on reasonable grounds, there is no certainty that they will be correct or that the range of outcomes indicated within the studies will be achieved.



Investment Highlights

1. Emerging Australian strategic silica sand producer

2. Outstanding project economics and logistics

3. Combined NPV₁₀ after tax \$727m

4. Ideally placed to capitalise on robust market outlook and demand

5. Rapid pathway to financing and production





Corporate & Capital Summary

Capital Structure

Shares On Issue	(m)	445
Options on Issue ¹	(m)	69.5
Share Price	cents	9
Cash (30 Dec)	A\$m	3.9
Debt	A\$m	Nil
Market Capitalisation	A\$m	40

¹ Volume weighted exercise price 10.67 cents

Directors

Paul Boyatzis	Non-Executive Chairman
Bruce Maluish	Managing Director
Peter Pawlowitsch	Non-Executive Director

Share Price (12 month)





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Thank you

Bruce Maluish

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