



# **The Emerging Force in the Premium Zircon Industry**

Company Presentation, February 2020



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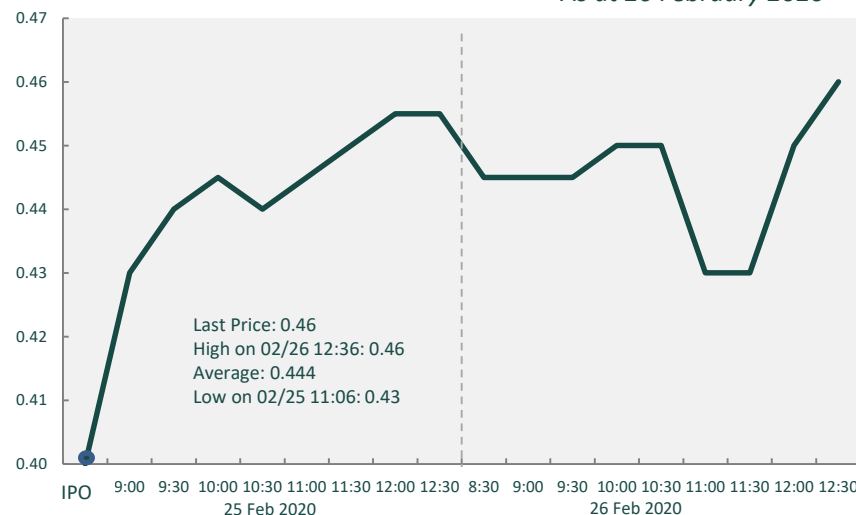
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## Company Description

- PYX Resources Limited (NSX: PYX) is a global producer of premium zircon listed on the National Stock Exchange of Australia in February 2020.
- The company's flagship asset is the Mandiri project, located in the alluvium sediment rich region of Central Kalimantan, Indonesia.
- Boasting the world's 5th largest producing zircon project, PYX is a large-scale, near-surface open pit operation in production since 2015 with exploration to date indicating the presence of additional valuable heavy minerals such as rutile and ilmenite amongst others within its mineral sands.

## Share Price (A\$)

As at 26 February 2020



## PYX Management Team

Title	Name
Chairman & CEO	Mr. Oliver B. Hasler
Non Exec Directors	Mr. Gary J. Artmont
	Mr. Bakhos Georges
	Mr. Alvin Tan

## Financials

Items	Half year ended 30 June 2019	Year ended 31 December 2018
Revenue (US\$ '000)	2,903	4,761
Revenue Growth	21.9%	290.9%
Net Assets (US\$ '000)	997	781
Net Profit Margin	8.3%	6.4%
Outstanding Shares		263.6 MM
Market Cap (AUD)		121.2 MM

## INVESTMENT HIGHLIGHTS

Note: PYX commenced trading on the National Stock Exchange of Australia (NSX) on 25 February 2020.

# Investment Highlights

Listed on the National Stock Exchange of Australia (NSX) , mineral sands company at production stage, with upside potential.

World-class mineral assets, strategically located in a Belt and Road country, with one of the highest zircon assemblage in the world, Inferred Resources and long mine life.

Mandiri features an **excellent geological setting**, with JORC Inferred Resources of 9.4 Mt of heavy minerals, including **6.0 Mt are zircon**, with **large additional exploration potential** in the Mandiri tenement. **High zircon assemblage of 64%.**

A well-diversified portfolio of international blue-chip customers across key geographies.

Strong zircon price outlook due to decreasing supply and increasing demand.

Top-tier management team with solid track record.

Significant upside potential supported by current price discount, additional resources exploration targets inside remaining areas and deeper zone in the Mandiri tenement and potential for rutile and ilmenite resource definition.

# Becoming a Leading Producer of Premium Zircon

## ABOUT PYX

- Pyx is a **leading global producer** of premium zircon, engaging in mining and processing activities centering on its **Mandiri** mineral sands project in Central Kalimantan, Indonesia
- As a **well established and integrated producer**, Pyx's key assets include the currently producing Mandiri project with notable resources and long mine life
- **High value assemblage** which is high in premium quality zircon (64%)
- Zircon deposits in Indonesia are generally shallow, and require **minimal capex** and **low operating expenses**



## INVESTMENT HIGHLIGHTS



Operations



Markets



Financials

# Board of Directors



OLIVER B. HASLER



Chairman of the Board  
Chief Executive Officer

Oliver is an accomplished chief executive, president and board member successfully leading world-class businesses and brands spanning multiple industries and markets, including natural resources, agro-industry, innovative manufacturing and various industrial sectors. He was named as one of the 50 best CEOs by Forbes Magazine. His most recent accomplishment was the successful transformation of the publicly-traded Spanish natural resources, paper and packaging company, Europac Group, in a short span of 3 years into a mid-cap company which was then acquired by DS Smith for a value exceeding US\$2 billion. Oliver earned a Masters degree in Materials Engineering from Federal Institute of Technology in Zurich, Switzerland and an MBA with honors from the Universidad Iberoamericana in Mexico City.



GARY J. ARTMONT



Director

Gary has forty-six years of experience in the mining business operating in 21 countries and is familiar with all aspects of mineral exploration, from grassroots to project pre-feasibility studies through to mining operations and is a fellow member of AUSIMM #312718 qualified to write NI 43-101 or JORC Competent Person reports. Gary has worked as a geologist and project manager for multiple organizations over the past four decades, including Geostar Consulting, Rio Tinto, PT Pelsart Indonesia, PT Freeport Indonesia and Ivanhoe Mining China. Gary earned a Bachelor Degree from Waterloo University, Ontario.



ALVIN TAN



Director

Alvin Tan has over 15 years corporate experience in Australia and Asia, including mergers, acquisitions, capital raisings and listings (on ASX, the Alternative Investments Market of the London Stock Exchange, Kuala Lumpur Stock Exchange and the German Stock Exchange). Mr Tan studied at the University of Western Australia, gaining a Bachelor of Commerce with honors, and subsequently was employed by KPMG in Kuala Lumpur as a financial consultant. He was a founding director of various companies that are now listed on ASX. Mr Tan currently serves on the board of ASX listed Advanced Share Registries Ltd and BKM Management Ltd. He also has interests in companies in exploration, property development, plantation and investment holdings.



BAKHOS GEORGES



Director

Bakhos has more than forty years of experience in management and operation in the wholesale, retail and pharmaceutical sectors with significant direct involvement in internationally focused import/export operations. Bakhos has received the Order of Australia Medal (OAM) in 2019 for service to the community. He currently serves as Director of Saint Charbel's Aged Care Centre and is a Justice of the Peace (JP) in and for the State of New South Wales. Bakhos received a B.Ph.Chem from USMV in 1982.



# Mineral Sand Includes a Wide Group of Minerals

- Mineral sands is a group of minerals commonly found and mined together from water or wind concentrated deposits. The principal valuable minerals include zircon ( $\text{ZrSiO}_4$ ), rutile ( $\text{TiO}_2$ ), ilmenite ( $\text{Fe.TiO}_3$ ), leucoxene ( $\text{FeTiO}_3$ ,  $\text{TiO}_2$ ) and monazite (Ce, La, Th).
- Mineral sands share similarities with other alluvial mining commodity types such as diamonds. However, they are different to most commodities. The exploration, development, mining and processing of mineral sands is atypical within the resource sector, **because at virtually every stage it is possible to visually estimate the grade and composition of the Heavy Mineral (HM) and valuable heavy mineral (VHM).**
- Mineral sands consists of two principal product streams: 1) zircon; and 2) titanium dioxide minerals – in the form of rutile, ilmenite and leucoxene.

## Heavy Mineral Sand

Mined from the Mandiri Tenement, Pyx Heavy Mineral have best in class Assemblage Value, as their Zircon content (64%) is superior to all the peers

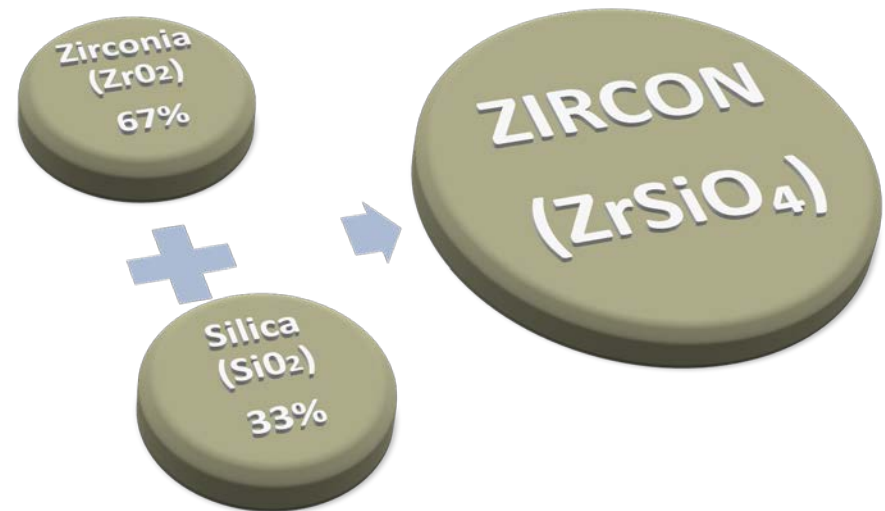


# Zircon Characteristics

- Zircon is the mineral sand component with the highest market value.
- Zircon is a major product of the mineral sands industry. In most projects zircon and titanium minerals exist as co-products.
- An increase in the importance of zircon has resulted in increasing zircon prices and a reduction in the amount of high grade mineral sand resources available.

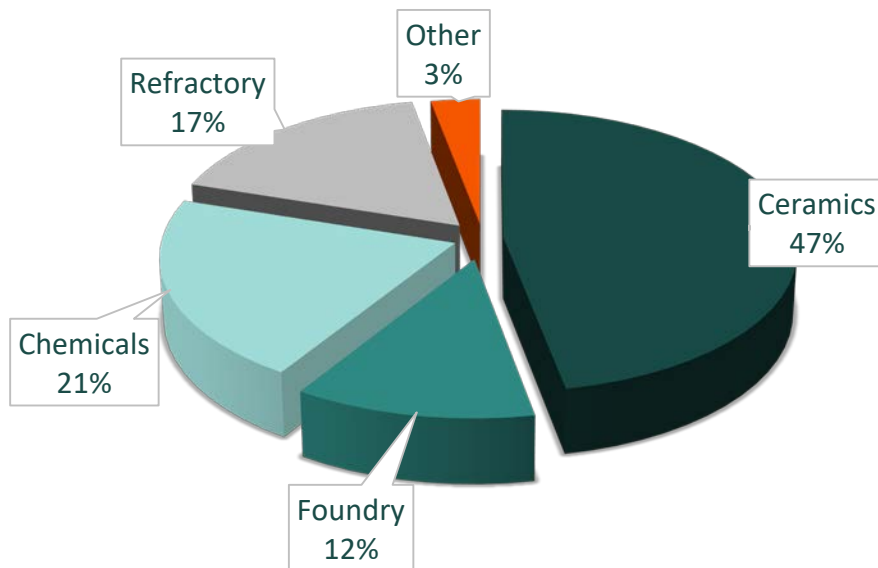
## Zircon Attributes :

- Opacity – Whiteness
- Hardness
- Low Thermal Expansion
- High Melting Point
- Low Thermal Conductivity
- Chemically Inert
- Low Neutron Absorption



# Broad Applications of Zircon

## ZIRCON DEMAND BY END USE, 2018

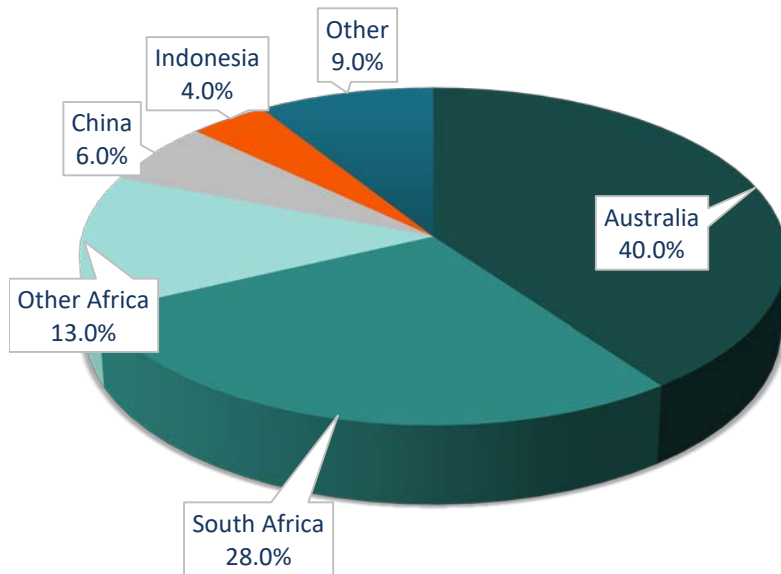


- Zircon is used in ceramics, precision and specialty castings, various refractory applications, catalysts, fuel cells, fiber optics, nuclear power generation, water treatment and medical prosthetics are some of the major applications of zircon.
- Zircon and its derivatives have remarkable properties of strength, hardness, heat resistance and wear resistance.
- Zircon is also used to produce synthetic gemstone and diamond simulant.

# World Zircon Mine Productions & Reserves

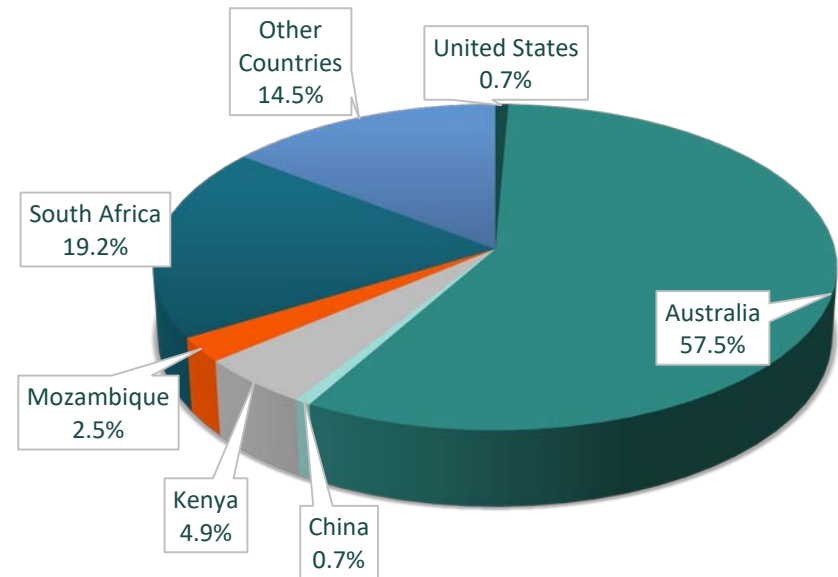
## GLOBAL ZIRCON PRODUCTION BY REGION

2018 Total Production ~ 1.2mt



## GLOBAL ZIRCON RESERVES BY COUNTRIES

2018 Total Reserves ~ 73mt



Source: ILUKA Investor Briefing, October 2019  
U.S. Geological Survey, 2019

*Note: Indonesian assets have no recorded Zircon reserves. Zircon Reserves Data does not include Indonesian supply base. This is because zircon deposits in Indonesia are generally shallow, and require minimal capex and low operating expenses.*

# Alluvial Deposit Mining in Kalimantan

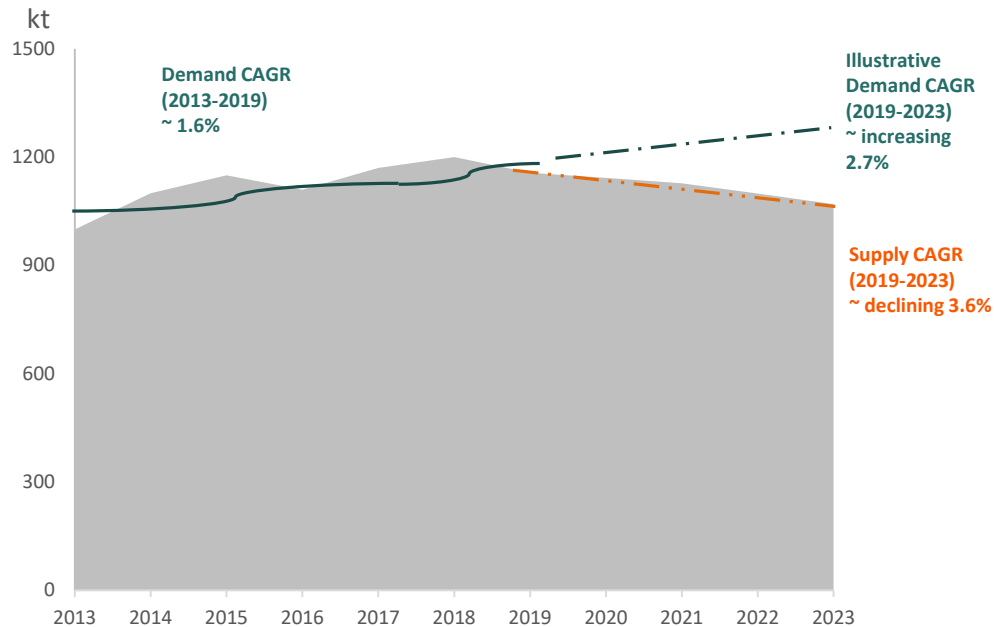
## The Location of the Main Producing Districts in Kalimantan



- Well established alluvial deposit mining for zircon, rutile, ilmenite, monazite, and placer gold
- Economic minerals were derived from the uplift and deep erosion of the Paleozoic to Cretaceous basement rocks which contains low-grade disseminated and vein gold mineralization
- Zircons were derived from Cretaceous granites of the Schwaner Mountains
- The Chinese Kongsis dominated for gold and diamonds from 100 AD to the 18th century, Indian trading companies were also active since the 4th century, while the Dutch East India Company controlled the alluvian operations by the end of the 18<sup>th</sup> century
- Currently, significant gold and zircon production is derived from numerous producers
- The Kahayan River system contains an enormous undeveloped gold resource
- Platinum group metals have also been detected in the Mandiri heavy mineral concentrates

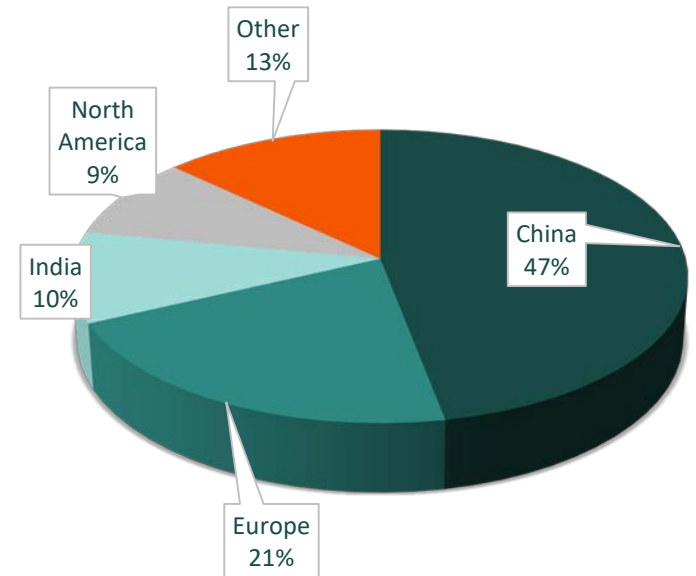
# Zircon Market Dynamics & Demand by Region

## GLOBAL ZIRCON SUPPLY AND DEMAND OUTLOOK



*Note: Illustrative demand CAGR (2019-23) are indicative only.*

## GLOBAL ZIRCON DEMAND BY REGION (2018)



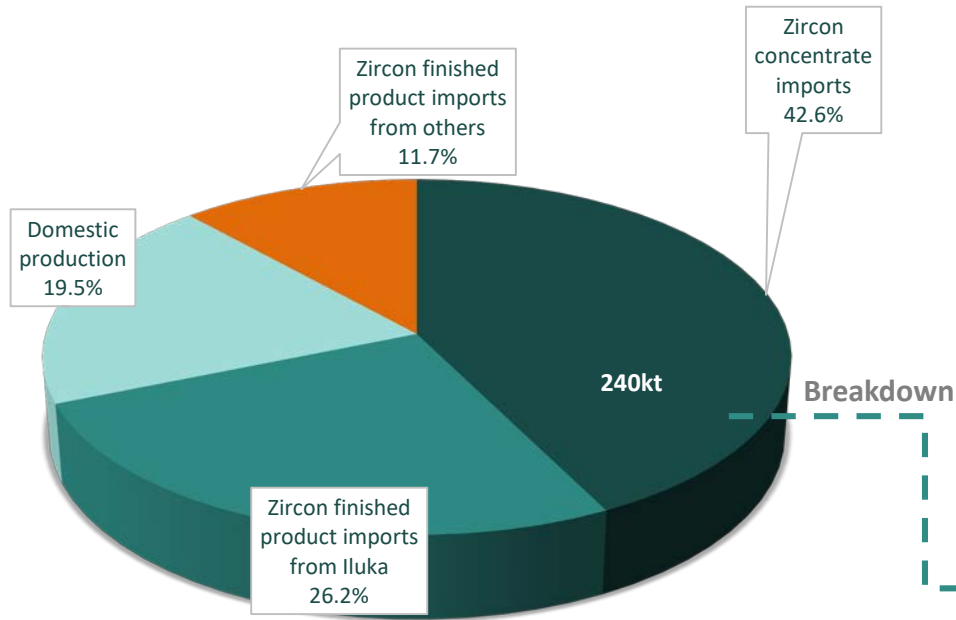
**A Substantial supply gap is emerging, which is likely to support a robust zircon price environment in the near future**

Source: ILUKA, TZMI, Sheffield Resources

# China Zircon Demand

## CHINA ZIRCON DEMAND BY SOURCE OF SUPPLY

2018 Total Zircon Demand ~ 564 kt



*Note: Zircon finished product imports from others were around 66 kt in 2018, including Indonesia.*

*Zircon concentrate imports are stated as zircon equivalent tonnage.*

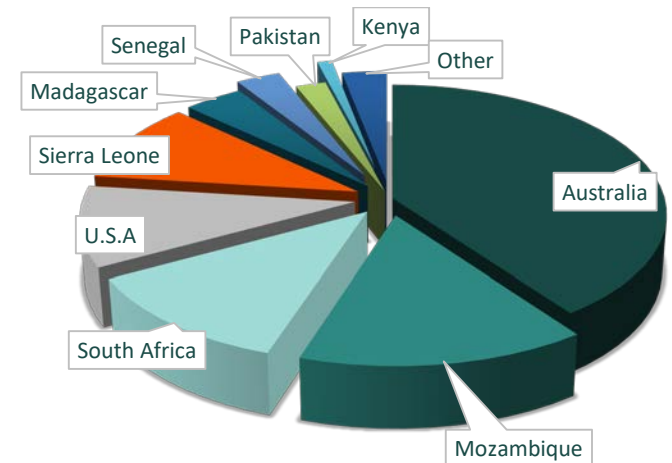
China's annual demand for zircon accounts for about 47% of global supply.

China's zirconium reserves rank fifth globally, accounting for only 0.7% world wide.

China needs to import a large amount of zirconium and mineral sand.

## CHINA ZIRCON CONCENTRATE IMPORTS BY COUNTRIES

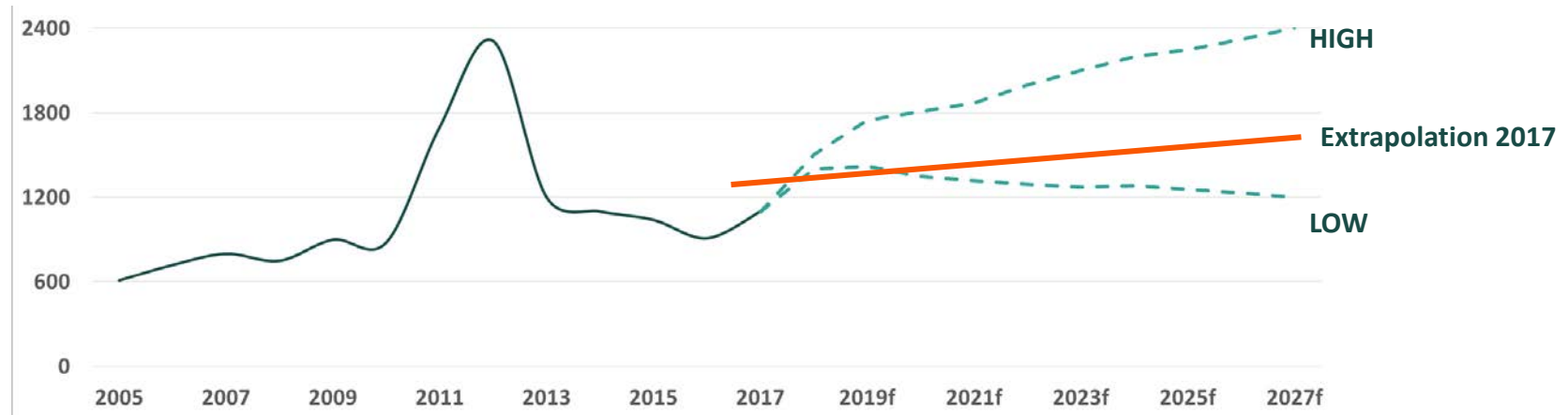
2018 Total Zircon Concentrate Imports ~ 240 kt



# Zircon Scarce and Concentrated Supply is Boosting Price

- The Zircon Reference Price, introduced by Iluka, increased US\$170 per tonne (12%) effective 1 October 2018 to US\$1,580 per ton, and is still currently unchanged, with the same forecast extended to March 2020
- It is a fact that the grade of known deposits is declining
- Following industry consolidation in the last 10 years, the top 5 producers Iluka (336k tons), Tronox/Cristal (228k tons)\*, Rio Tinto (192k tons), TiZir (60k tons) and Kenmare (48k tons) control approximately 72% of global supply in 2018, and therefore pricing environment is expected to remain strong
- There is a lack of supply potential for the foreseeable future and the future demand may exceed supply
- Market is expected to remain balanced in 2019 with a need for additional supply thereafter. The demand for zircon is growing, existing mines are mature and grade decline is imminent

## ZIRCON (PREMIUM GRADE) PRICE AND OUTLOOK TO 2027



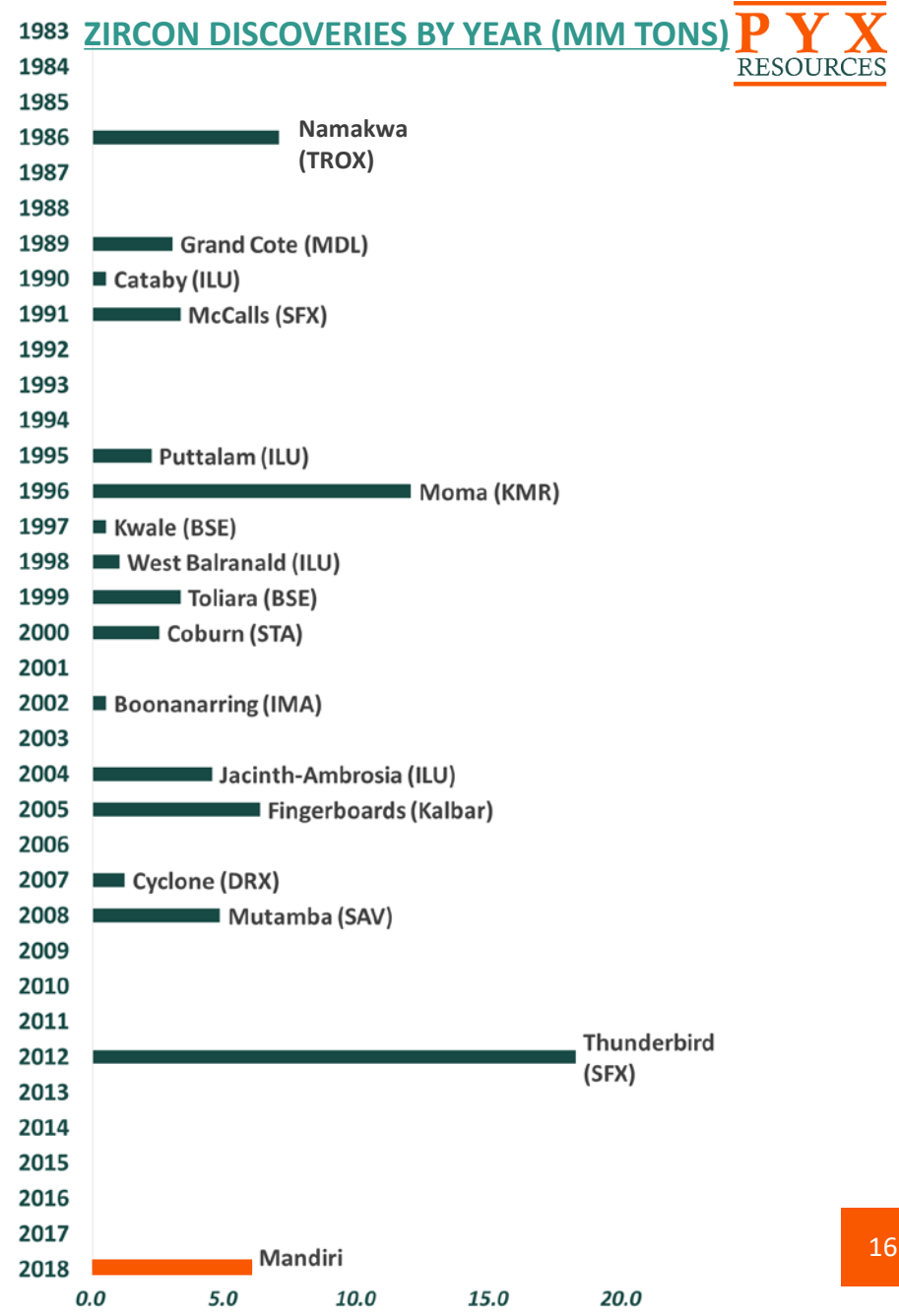
Source: ILLUKA Investor Briefing, TZMI, Company Analysis



# Mandiri Unique Discovery

- Pyx's Mandiri project is uniquely positioned **as the largest zircon discovery in the world since 2012.**
- The chronologic table to the right indicates that the Mandiri operation is the most recent significant discovery of zircon globally.
- In terms of contained zircon, it is the 5th largest mineral sands target in the world, without taking into consideration the upside of the remaining areas of the Mandiri tenement.

## REVIEW OF OPERATIONS

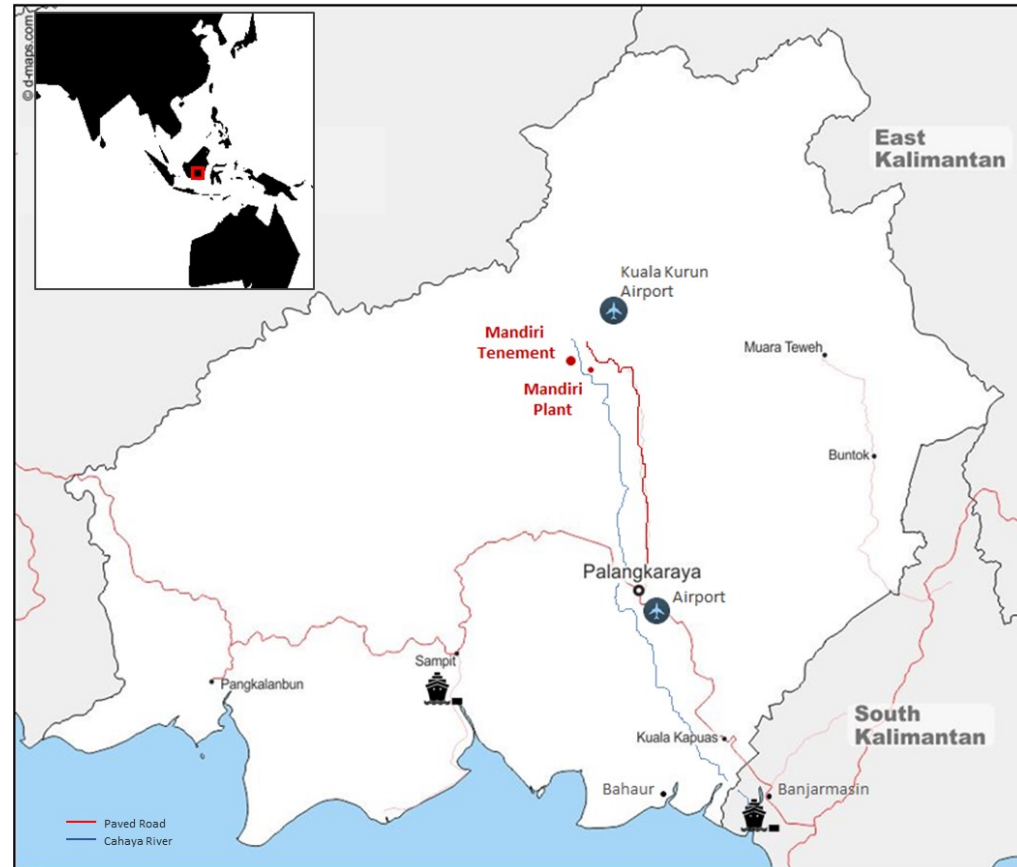


# Strategic Location

- Pyx's Mandiri Operations are located in Gunung Mas Regency in Central Kalimantan.
- 20 km away from the nearest township of Kuala Kurun.
- 170 km Northward of the provincial capital city Palangkaraya.
- Granted Mining Business Permit for Production Operations (IUP-OP) on 2nd September 2010 for a total area of 2,032 ha.
- The condition of land cover consists of 40% of secondary forest, 30% bush, 15% of community garden, and the remaining 15% is open area.

## Accessibility :

From Jakarta to Palangkaraya, 1h 20m by commercial flights. Drive from the airport to the tenement is 2h 30m



# Mandiri Resources Support a Long Mine Life

The Inferred Mineral Resources published in March 2019 for the Mandiri HMS deposit are defined as 126 Mt containing 7% HM including 9% slimes (based on an area of 1,100ha only). **Contained Zircon inferred resources are estimated at 6 million tons**

## Mineral Resources above 2% HM lower block cut-off grade (unrounded)

Area	Category	Tonnage (Mt)	HM (%)	Slimes (%)	Oversize (%)
Mandiri	Inferred	126.3	7.43	8.98	16.14

The tenement is highly prospective for heavy minerals. Further exploration potential includes:

- deeper zones below the water table in current resource area
- remaining 46% of the total concession area of 2,032 ha
- Rutile and ilmenite

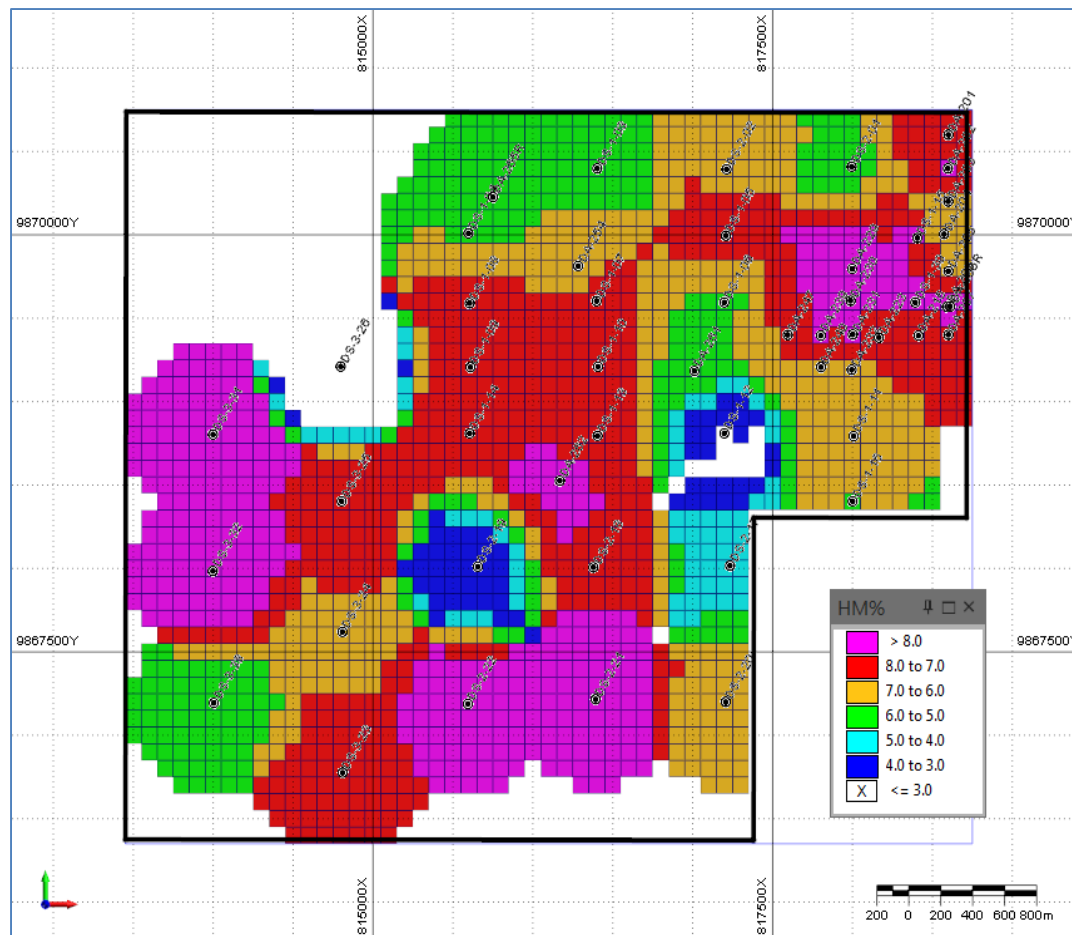
## Assemblage of Ore and Finished Products

	Mining		Finished Product	
	Mined HM (tons)	Assemblage (%)	Finished Product (ton)	Assemblage (%)
<b>Zircon</b>	64	64%	64	97%
- of which Zirconium	43	43%	43	65.5%
- of which Silica	21	21%	21	32%
<b>Rutile</b>	8.5	8.5%	0	0%
<b>Ilmenite</b>	9.5	9.5%	0	0%
<b>Other</b>	18	18%	1.7	3%
<b>Slime/OS</b>	0	0%	0	0%
<b>Total</b>	100	100%	65.7	100%

# Limited Alluvium Bed Thickness Enables Open Pit Mining

## MANDIRI DEPOSIT ORE BLOCK MODEL OUTPUT

- Limited thickness of Alluvium Bed deposit, with an average thickness of 3.68 metres
- Low complexity, open sky mining has a beneficial impact on cash margins and environmental assessment
- MSP Engineering engaged to automate logistics, mining operations and wet concentration processes



# Mandiri - Producing since 2015

- Mandiri project commenced production in August 2015.
- Mandiri is currently in operation with an installed production capacity of 1,500 tpm (or 18,000 tpa) of zircon product and has produced more than 6,000 tonnes of zircon product to-date.
- The primary product of the Mandiri project is 65.5 grade Zircon (premium grade for export). Other potential by-products include rutile, and ilmenite.
- Mandiri's separation plant processes mineral sands ores to separate the valuable heavy mineral sand from the non-valuable and lighter gangue that makes up most of the input slurry. The processing plant employs a typical, wet concentration process to produce a high-grade heavy mineral concentrate (85-95% HMC).
- Further expansion is planned and will take place over the next 5 years to expand to a capacity of 4,000 tpm.

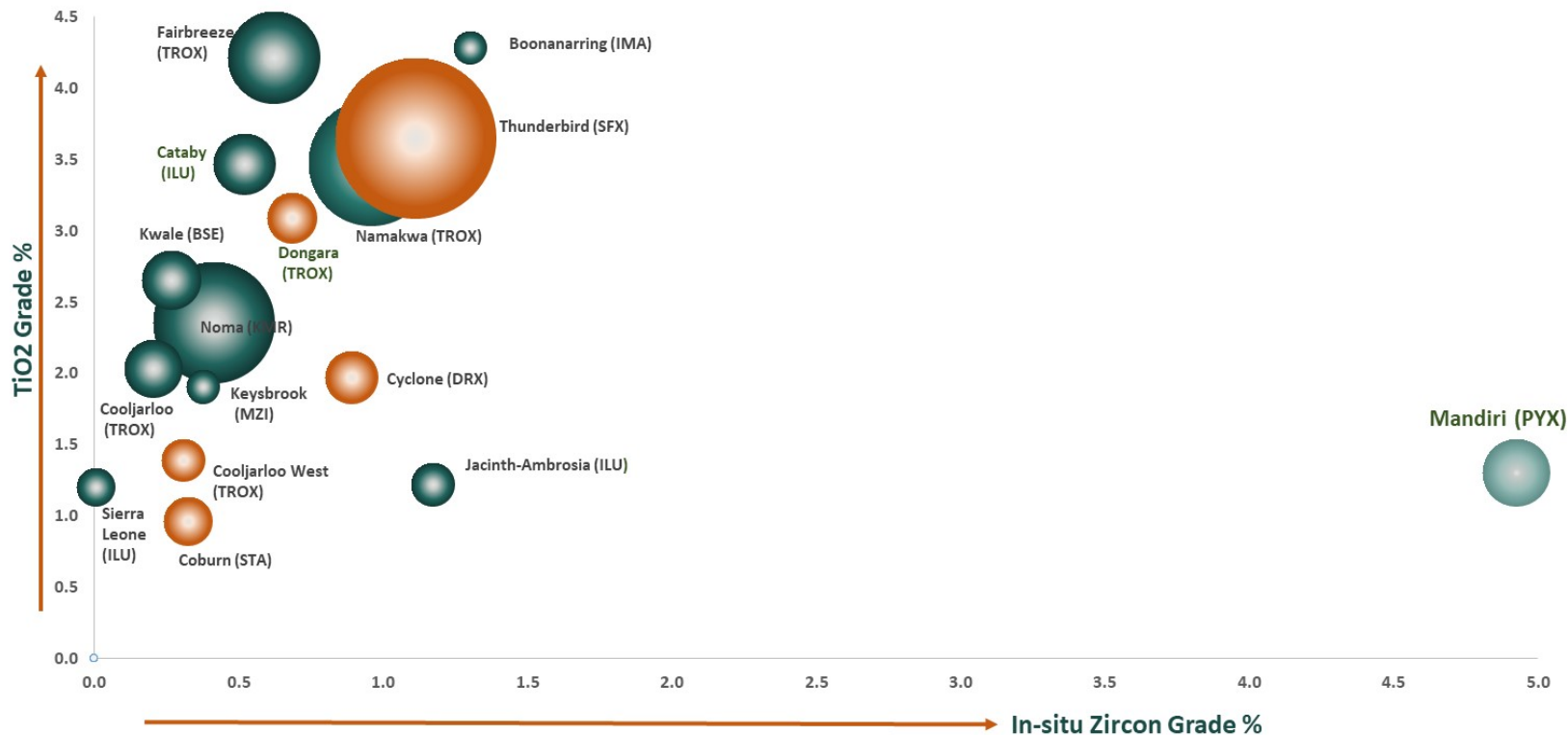


# Well Diversified Customer Mix

- Pyx customer base consists of a pool of well-diversified international blue-chip customers globally, providing protection to Pyx against any concentration risks.
- Key customers are located across major European and Asian markets.
- Nearly 95% of its revenues are USD denominated, resulting in limited Indonesian currency risk.



# Pyx is a Clear Outlier in Terms of Zircon Grade



## Notes:

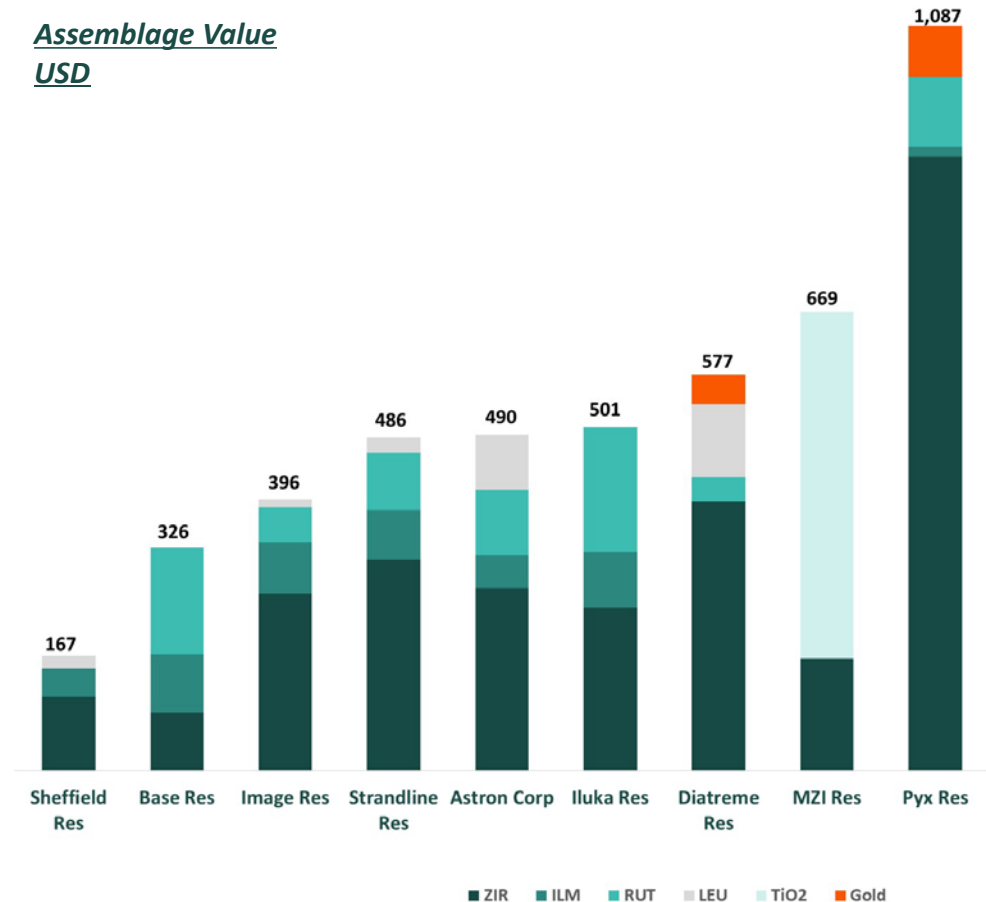
1. Mandiri Zircon grade ranked the highest among current major mineral sands operations and projects under investigation globally.
2. Bubble size proportional to tonnes of Valuable Heavy Mineral (VHM) resources.
3. Blue bubbles projects in production phase, orange bubbles projects in exploration/development phase.
4. TiO2 grade calculated as the VHM grade of Ilmenite, Leucoxene, and Rutile.
5. Data compiled from public sources and Pyx's research.



# Pyx Superior Assemblage

- The following chart shows the assemblage composition of Pyx and its peer group in the industry.
- Pyx has the highest assemblage value amongst its peer set and it is already in production
- Assemblage is the relative percentage of each different valuable minerals found within a heavy mineral sands deposit, such as Zircon (ZIR), Ilmenite (ILM), Rutile (RUT), and Leucoxene (LEU).
- Each valuable mineral has a different market price. The assemblage value is the weighted average value of all the valuable heavy minerals in the ore.

## Assemblage Value USD



Source: Public Filings, Pyx Research

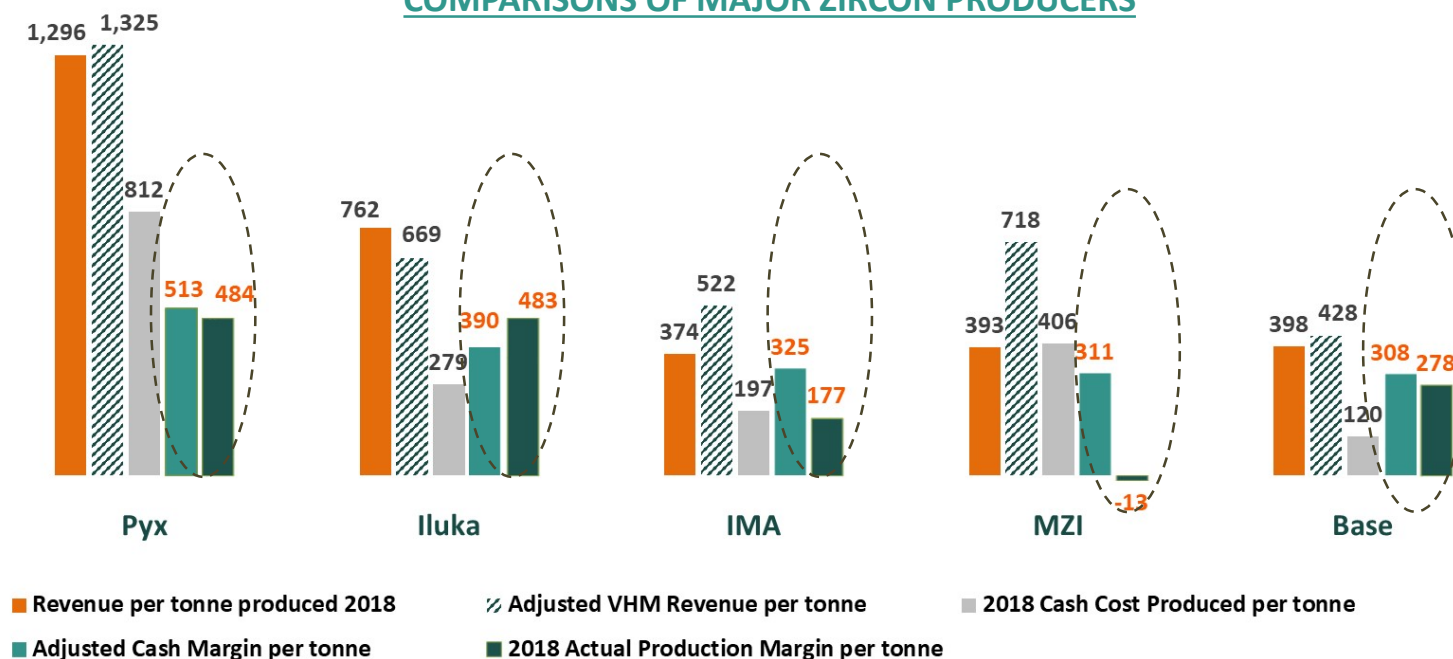
Note: Pyx exploration target not fully included in Resource Statement

# Pyx Superior Cash Margin are Sustainable Long Term

Long term sustainable cash margins depend on the in-situ assemblage mix, and might be different from the cash margins realized in one particular year, due to the fact that the production mix in a particular year might be different from the resource assemblage. As an example, due to “selective mining” Iluka is currently extracting minerals with a higher value per ton than the assemblage mix of its in situ resources, and as such its “sustainable” average revenue per ton is USD 669 vs USD 762 which Iluka has achieved on average in FY 2018.

Cash costs are mostly composed of Heavy Mineral mining and concentration, which are largely independent from the production mix. Production mix only impact processing costs, which are a small fraction of the cash costs.

## 2018 ACTUAL PRODUCTION MARGIN AND ADJUSTED VHM MARGIN COMPARISONS OF MAJOR ZIRCON PRODUCERS

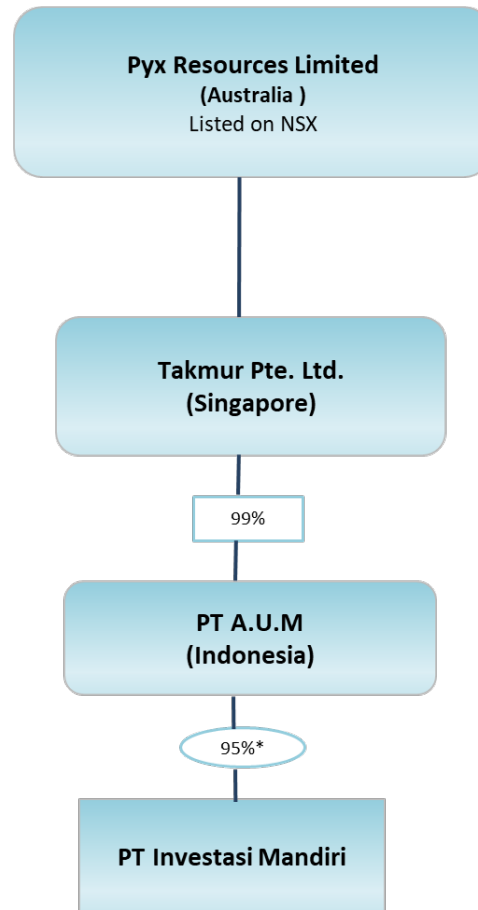


Source: Public Filings, Cedrus Research

## REVIEW OF OPERATIONS

Note: Adjusted VHM Revenue calculated on mineral components disclosed on Resource Statement.  
 Data for IMA (Image Resources) was collected in year 2019, when its production just started.

# Organizational Structure



*All Subsidiaries are owned 100% unless otherwise noted*

*\* Economic interests through operation and management agreement*

# Valuation Benchmarks against Listed Peers

The following table shows the valuation (in terms of Enterprise Value (EV) per ton of JORC-compliant resources) of comparable mineral sands mining companies listed on the ASX, which is strongly correlated with the assemblage value of the Heavy Mineral (HM) resources as stated in each company's JORC-compliant statements.

As at 26 February 2020

	Share Price	Market Cap	EV	Resources (in situ THM)	Weighted Avg Assemblage Value	EV/Resources
	A\$	US\$ m	US\$ m	Mt	US\$	US\$/t
Iluka Sierra Rutile*	N/A	N/A	600.0	8.0	1,200	75.00
<b>Pyx Resources</b>	<b>0.46</b>	<b>83.6</b>	<b>76.6</b>	<b>9.4</b>	<b>1,087</b>	<b>8.17</b>
MZI Resources**	0.02	3.3	130.2	3.7	669	35.53
Iluka Resources	8.85	2,580.5	2,572.7	175.8^	501	14.63
Astron Corporation	0.19	16.9	20.6	182.8	490	0.11
Strandline Resources	0.11	28.3	24.1	20.2	486	1.19
Image Resources	0.19	128.6	157.5	3.5	396	44.52
Base Resources	0.21	169.8	149.8	72.0	326	2.08
Sheffield Resources	0.13	26.6	26.3	310.0	167	0.08

Source: Public Filings, Cedrus Research

PYX was traded at A\$ 0.46, implying EV/Resources ratio of US\$ 8.17 per ton of HM JORC compliant resource, with a substantial discount if compared to the peer listed companies with comparable assemblage value.

## VALUATION BENCHMARKS

\*: Iluka Sierra Rutile valuation is based on International Finance Corporation's investment of US\$ 60 million on Iluka's Sierra Rutile's 10% stake, with an assemblage value is US\$ 1,200 (i.e. spot price for Rutile)

\*\* : MZI Resources trading was suspended on March 2019. Market data updated on the day before suspension

^: Include 8 Mt from Sierra Rutile

# Additional Upside Potential in the Mid Term

There is significant upside potential for Pyx, including:

- additional targets from deeper zones below the water table in current resource definition areas (the initial auger drilling was undertaken at 200 m spacing and covered an area of 470 ha, or 23% of the total concession area of 2,032 ha), afterwards the distance was increased to 400m covering 1,100ha
- exploration targets in remaining areas within the tenement, to the northwest of the current resource estimation area (or 46% of the total tenement area)
- Upside on exploitation of rutile and ilmenite
- Enhanced profitability through expansion in production capacity and cost reduction from all in-house mining



# Competent Person Statement and Cautionary Note

The information in this report that relates to Exploration Targets, Exploration Results, Mineral Resources or Ore Reserves is based on information compiled by Dr John Chisholm, a Competent Person who is a Fellow of The Australasian Institute of Mining and Metallurgy. Mr Chisholm is engaged by Pyx and 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 Chisholm consents to the inclusion in the report of the matters based on his information in the form and context in which it appears.

This presentation contains forward-looking statements and forward-looking information within the meaning of applicable Australian securities laws, which are based on expectations, estimates and projections as of the date of this presentation.

This forward-looking information includes, or may be based upon, without limitation, estimates, forecasts and statements as to management's expectations with respect to, among other things, the timing and amount of funding required to execute the Company's exploration, development and business plans, capital and exploration expenditures, the effect on the Company of any changes to existing legislation or policy, government regulation of mining operations, the length of time required to obtain permits, certifications and approvals, the success of exploration, development and mining activities, the geology of the Company's properties, environmental risks, the availability of labour, the focus of the Company in the future, demand and market outlook for precious metals and the prices thereof, progress in development of mineral properties, the Company's ability to raise funding privately or on a public market in the future, the Company's future growth, results of operations, performance, and business prospects and opportunities. Wherever possible, words such as "anticipate", "believe", "expect", "intend", "may" and similar expressions have been used to identify such forward-looking information.

Forward-looking information is based on the opinions and estimates of management at the date the information is given, and on information available to management at such time. Forward looking information involves significant risks, uncertainties, assumptions and other factors that could cause actual results, performance or achievements to differ materially from the results discussed or implied in the forward-looking information. These factors, including, but not limited to, fluctuations in currency markets, fluctuations in commodity prices, the ability of the Company to access sufficient capital on favourable terms or at all, changes in national and local government legislation, taxation, controls, regulations, political or economic developments in Indonesia and Australia or other countries in which the Company does business or may carry on business in the future, operational or technical difficulties in connection with exploration or development activities, employee relations, the speculative nature of mineral exploration and development, obtaining necessary licenses and permits, diminishing quantities and grades of mineral reserves, contests over title to properties, especially title to undeveloped properties, the inherent risks involved in the exploration and development of mineral properties, the uncertainties involved in interpreting drill results and other geological data, environmental hazards, industrial accidents, unusual or unexpected formations, pressures, cave-ins and flooding, limitations of insurance coverage and the possibility of project cost overruns or unanticipated costs and expenses, and should be considered carefully. Many of these uncertainties and contingencies can affect the Company's actual results and could cause actual results to differ materially from those expressed or implied in any forward-looking statements made by, or on behalf of, the Company. Prospective investors should not place undue reliance on any forward-looking information.

Although the forward-looking information contained in this presentation is based upon what management believes, or believed at the time, to be reasonable assumptions, the Company cannot assure prospective purchasers that actual results will be consistent with such forward-looking information, as there may be other factors that cause results not to be as anticipated, estimated or intended, and neither the Company nor any other person assumes responsibility for the accuracy and completeness of any such forward-looking information. The Company does not undertake, and assumes no obligation, to update or revise any such forward-looking statements or forward-looking information contained herein to reflect new events or circumstances, except as may be required by law.

No stock exchange, regulation services provider, securities commission or other regulatory authority has approved or disapproved the information contained in this presentation.

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