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20  
18

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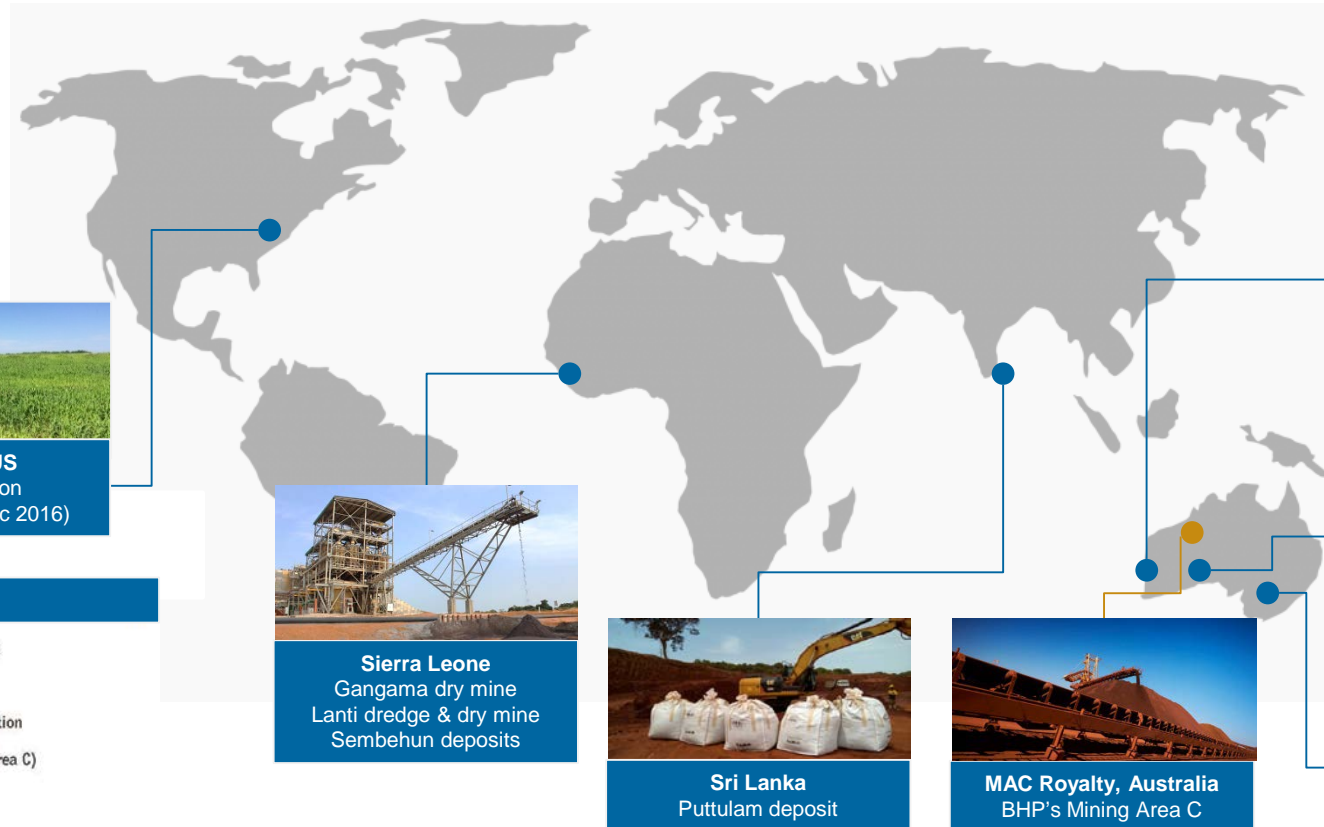
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This document contains non-IFRS financial measures including cash production costs, non production costs, Mineral Sands EBITDA, Group EBITDA, . Iluka management considers these to be key financial performance indicators of the business and they are defined and/or reconciled in Iluka’s annual results materials and/or Annual report. Non-IFRS measures have not been subject to audit or review.

All figures are expressed in Australian dollars unless stated otherwise.

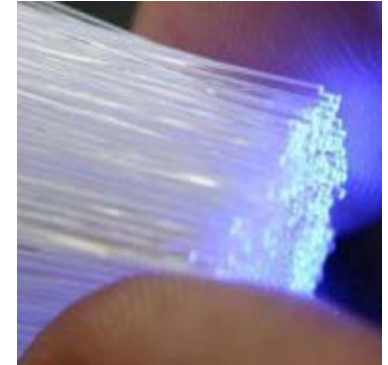
# Iluka's Asset Base

60 years experience in exploration, project development, mining, processing and marketing of mineral sands.



The company is a major producer of zircon and high-grade titanium dioxide products.

# Iluka's Product Portfolio



## Zircon

Premium grade zircons for ceramic tiles and sanitary ware  
Specialty grade zircons for chemical and refractory  
Zacura range for foundry and investment casting



## Titanium

High grade titanium feedstocks for chlorination  
High purity titanium feedstocks for welding consumables  
Low Sn titanium feedstocks for high grade titanium metal production (e.g. Aerospace)



# Business Focus

Operational  
excellence



Sustainable  
development



Expansion and  
improvements



Marketing strategy







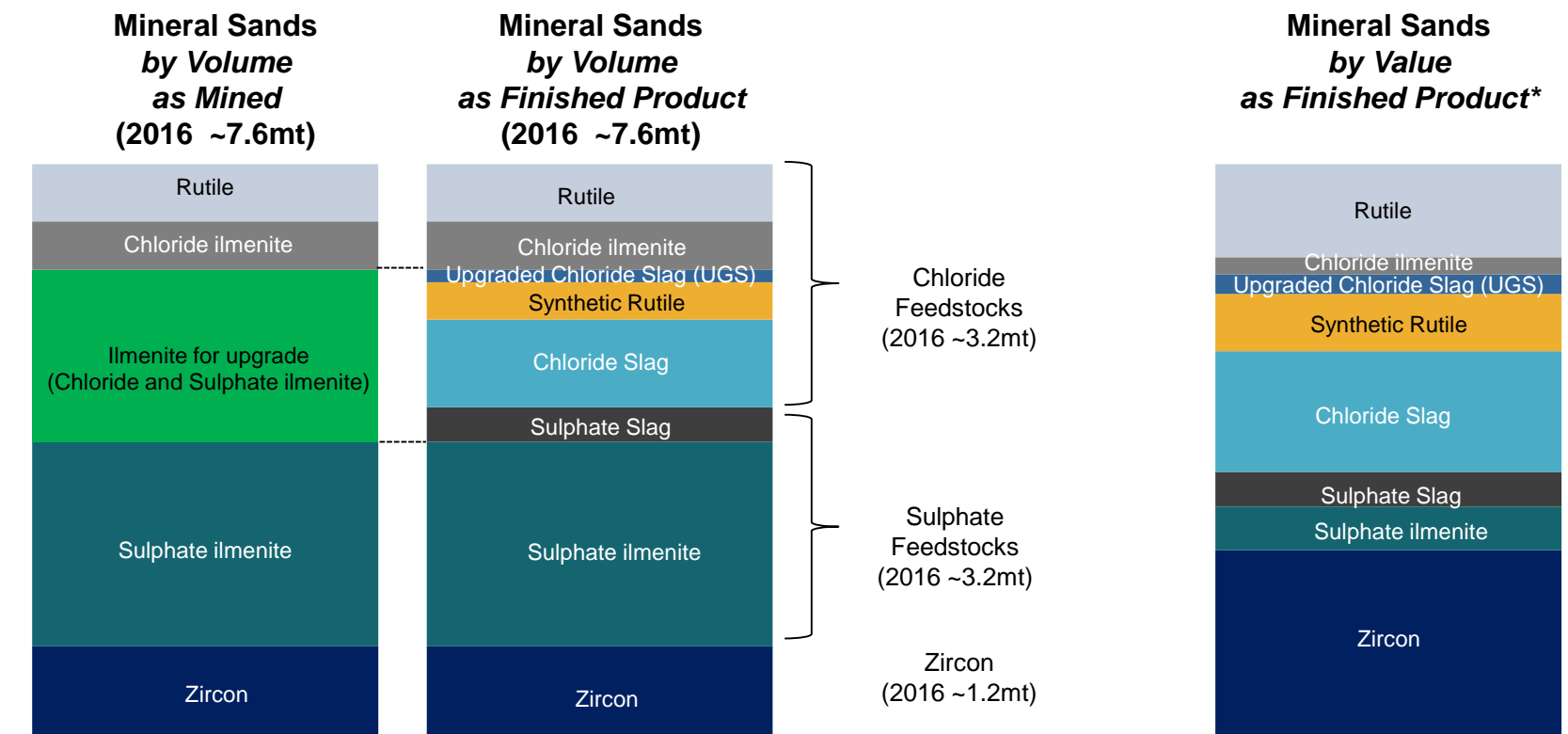
## Industry Dynamics

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# Global Mineral Sands Production

Proportionately, Zircon generates the largest revenue when taking into account the volume mined

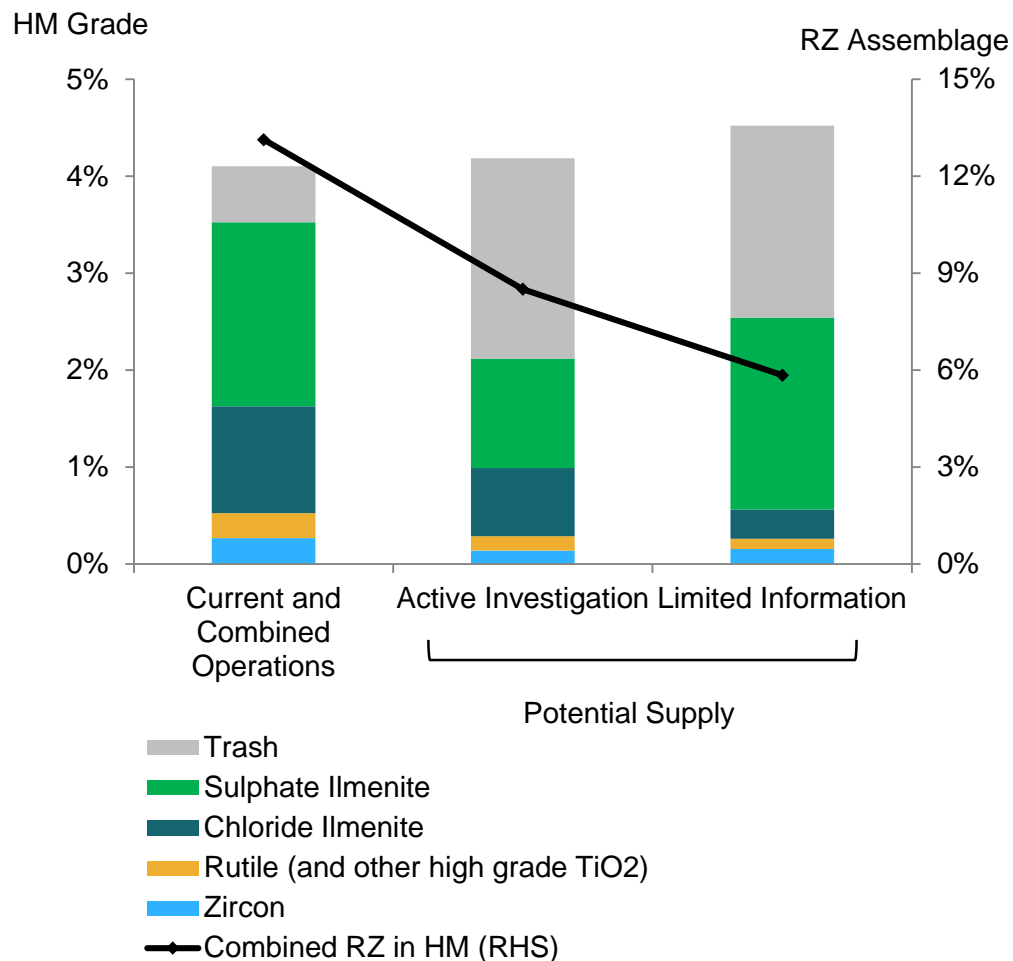


All titanium feedstock volumes in TiO<sub>2</sub> units  
Source: Iluka and TZMI

\* 2016 product volumes and 2016 industry average prices

# Valuable Heavy Mineral Decline

## Global Mineral Sands Resources Assemblage



### Iluka's assessment of industry ore bodies

- Trash component in heavy mineral grade increasing
- Rutile and zircon assemblage falling

### Industry challenge

- Need technical solutions for unconventional ore bodies and product specifications
- Exploration to find better ore bodies
- Achieving prices that maximise ROI
- Without incentivising substitution and thrifting



# New Project Supply Challenges

**Unconventional deposits requiring technical solutions** (eg. fine minerals, depth, product quality)

**Zircon and rutile** typically induced as **by-products** of ilmenite projects

**Limited high zircon and rutile assemblage projects**

**Higher unit costs** due to grade, distance to infrastructure and other factors

**Higher sovereign risk** locations

Iluka evaluates many projects and will remain disciplined in allocating capital.

In a tightening market, new projects may progress despite challenges.



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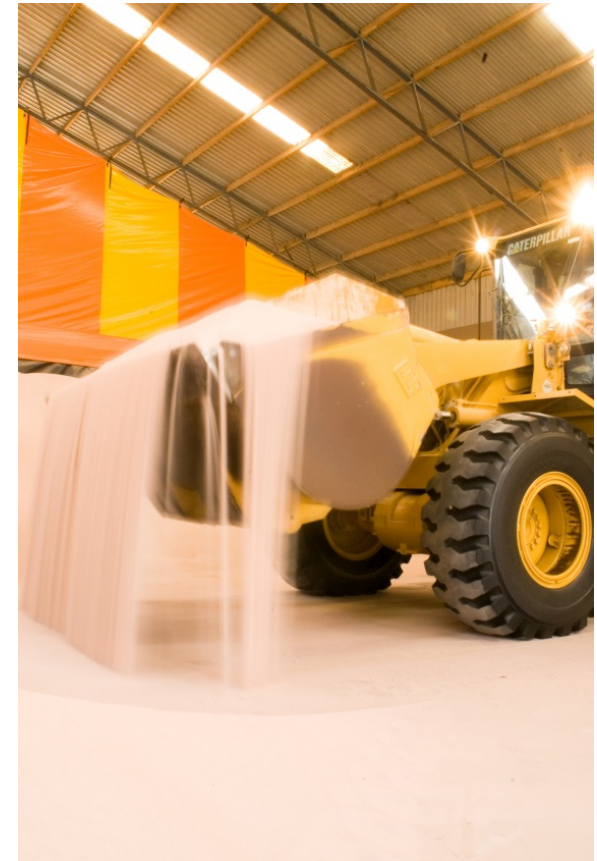
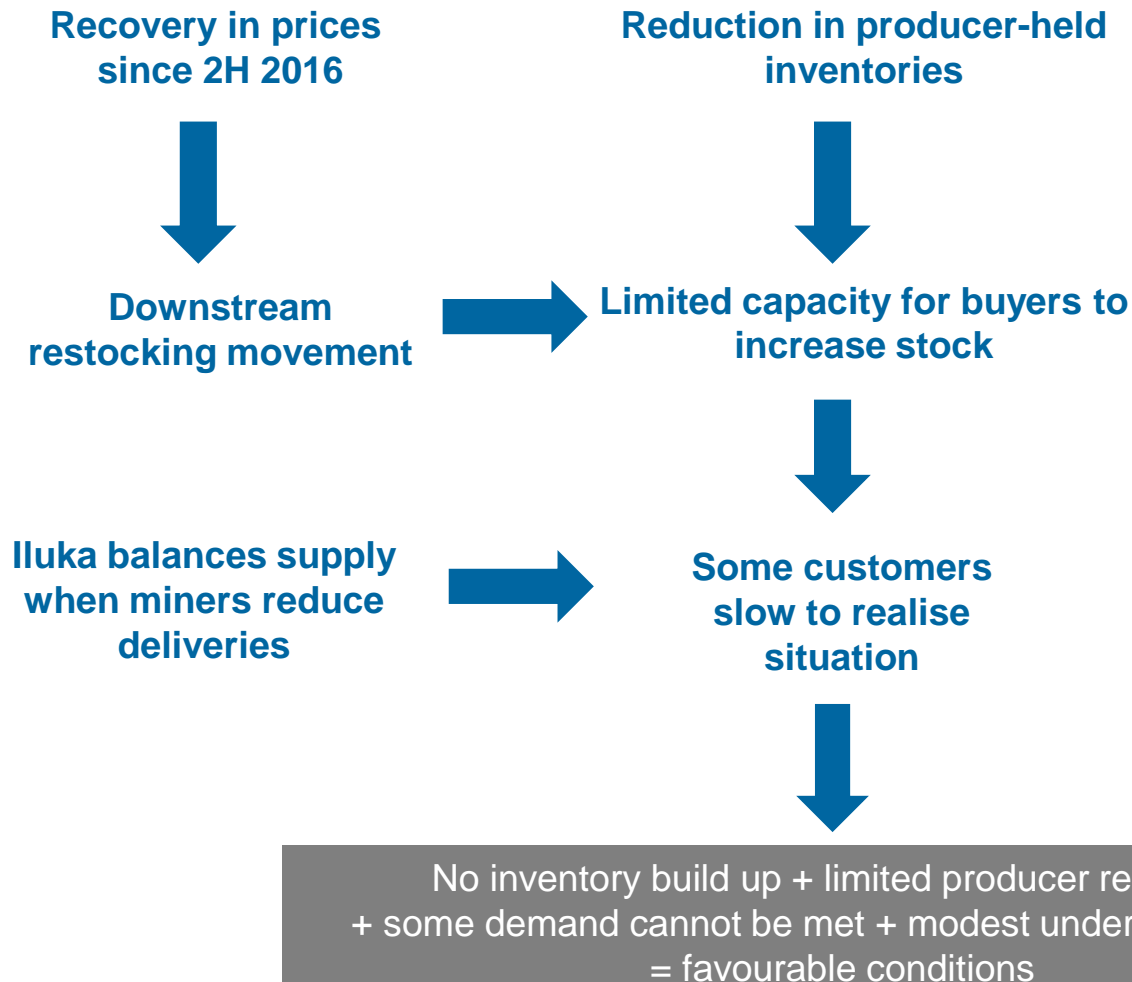
## Zircon Market





# Current Supply Demand Fundamentals Positive

## Zircon market tightness has arrived



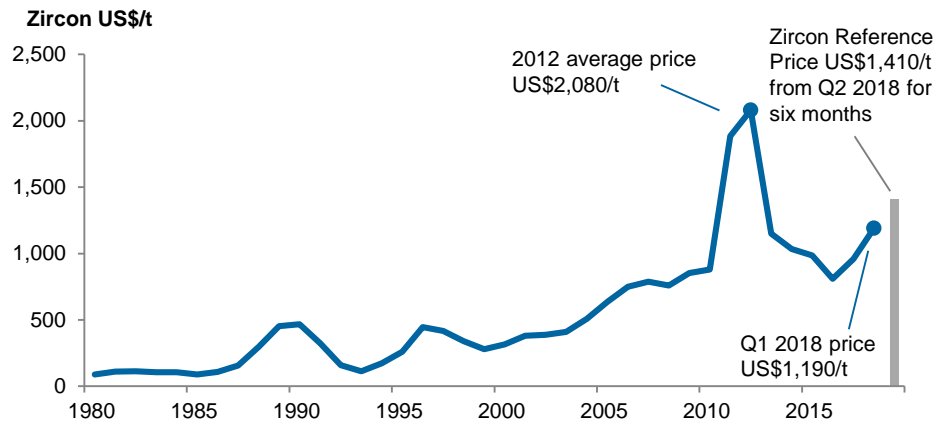
# 2018 Zircon Market

- Tight supply conditions leading to steady price increases
- Prices remain well down on previous spike
- Current price cadence avoiding historic volatility
- Downstream product prices have escalated

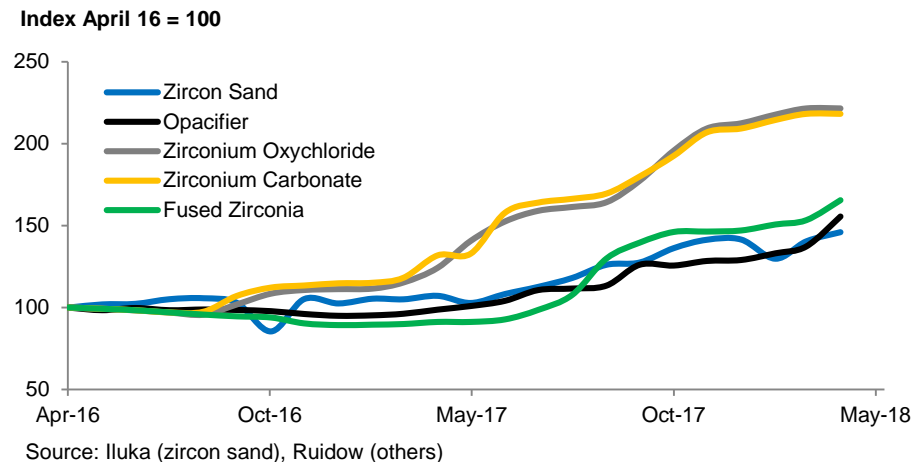
## Iluka's Zircon Pricing Strategy

- Zircon <5% of final tile cost
- Previous price spike induced substitution and thrifting
- Current customer feedback suggests higher prices can be absorbed if gradual
- Pricing strategy always subject to market response

## Zircon Price History



## Zircon sand compared to downstream prices

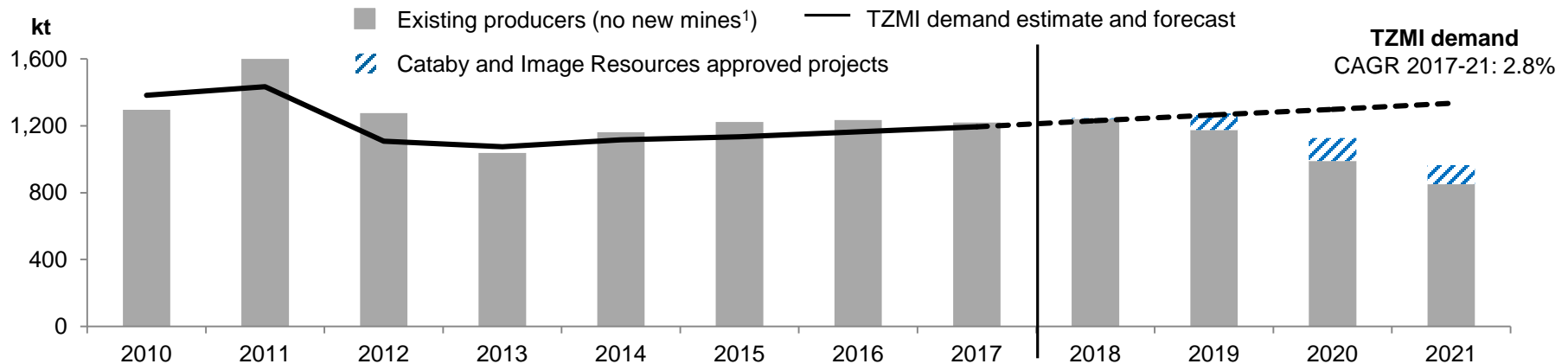




# Zircon Market Outlook

- Zircon from existing producers declining due to depletion and grade/assemblage decline
- Inventory largely depleted
- Supply projections include Iluka's Cataby development and recently funded Image Resources development
- Structural deficit could be mitigated by a combination Ambrosia mine move acceleration from 2022 to 2019 and likely supply response from artisanal miners in Kalimantan, Indonesia

## Zircon Supply and Demand – Existing producers and approved new mines



Note: In 2012, zircon demand fell by 200-250kt due to modernisation, substitution and thrifting, predominantly in the ceramics sector  
 Source: Iluka production, Image Resources outlook (May 2018) and TZMI supply for remaining producers; and TZMI demand February 2018



## High Grade Titanium Market



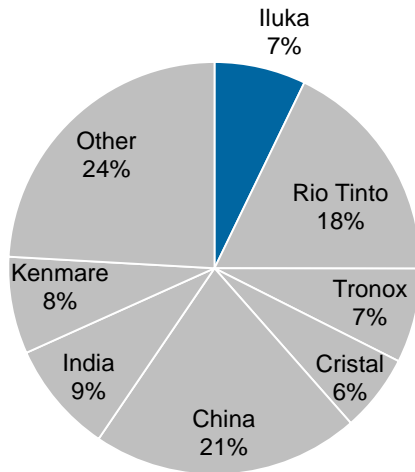




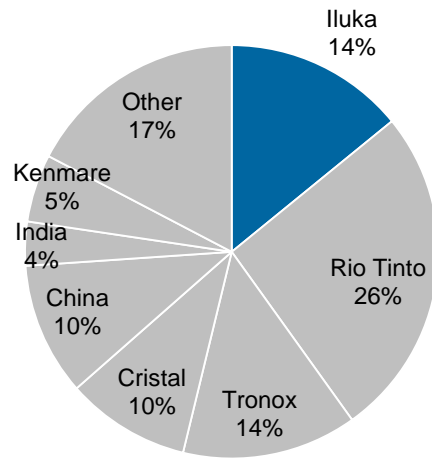
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# Market Position Strongest in Very High Grade

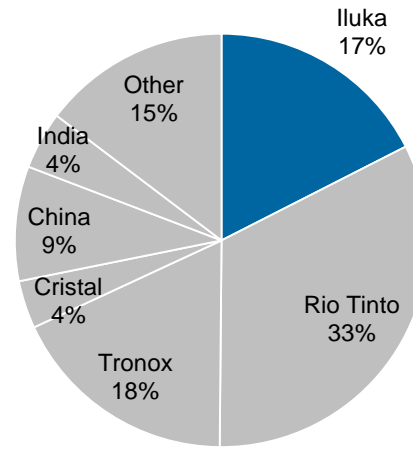
**Total TiO<sub>2</sub> Feedstock  
Chloride & Sulphate  
(2016 ~6.4 Mt)**



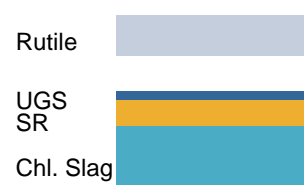
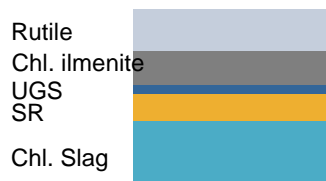
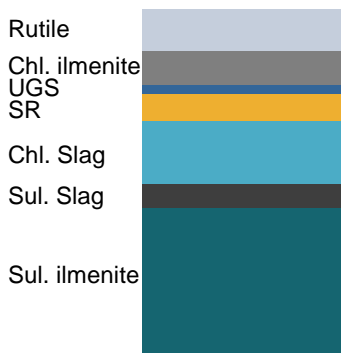
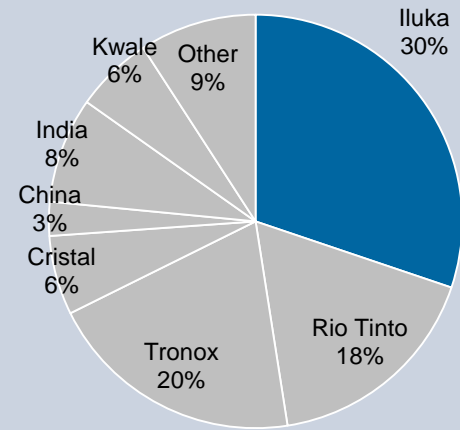
**Chloride Feedstock  
(2016 ~3.3 Mt)**



**High Grade Chloride  
(80%+ TiO<sub>2</sub>) Feedstocks  
(2016 ~2.5 Mt)**



**Very High Grade Chloride  
(90%+ TiO<sub>2</sub>) Feedstocks  
(2016 ~1.3 Mt)**



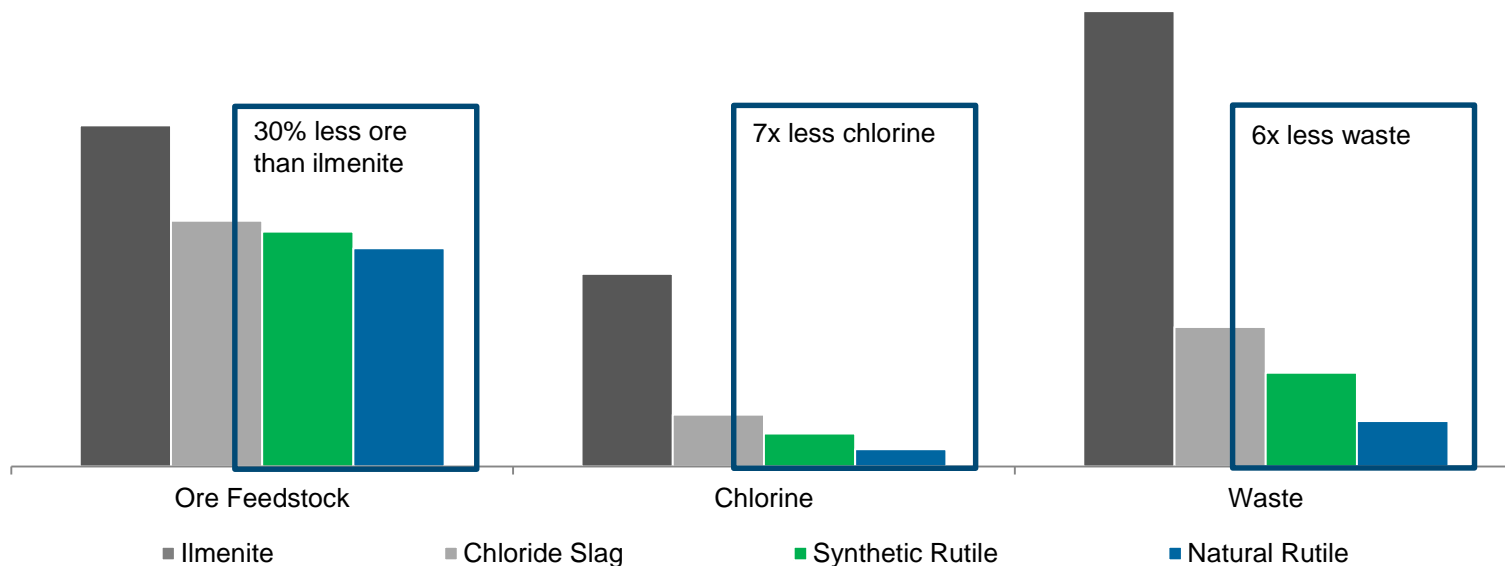
Note: Iluka production includes Sierra Rutile (acquired December 2016)

Source: TZMI, Company reports, Iluka

# High Grade Titanium Feedstock Advantage

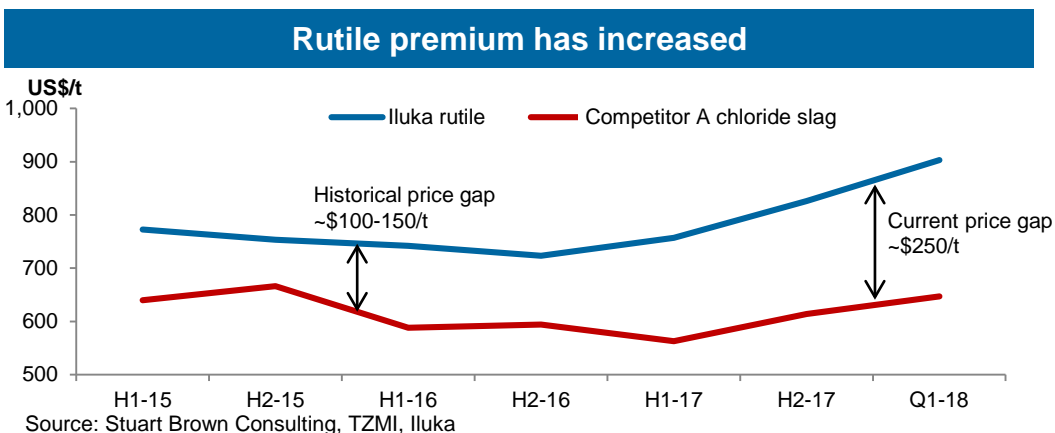
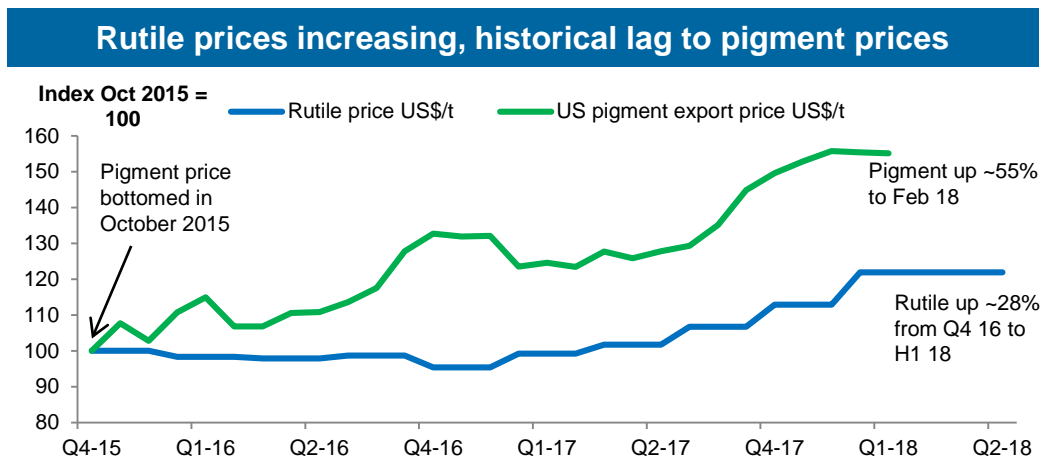
- Iluka is largest producer of Rutile
- Natural and synthetic rutile have a higher titanium grade than most slag feedstocks
- Advantages in pigment production:
  - lower ore tonnes required
  - lower chlorine input cost
  - lower waste generation (environmental and cost benefits)
- High 'value in use' for Iluka's main products

Higher grade feedstocks have lower costs, per tonne of pigment produced



# 2018 High Grade Titanium Feedstock Market

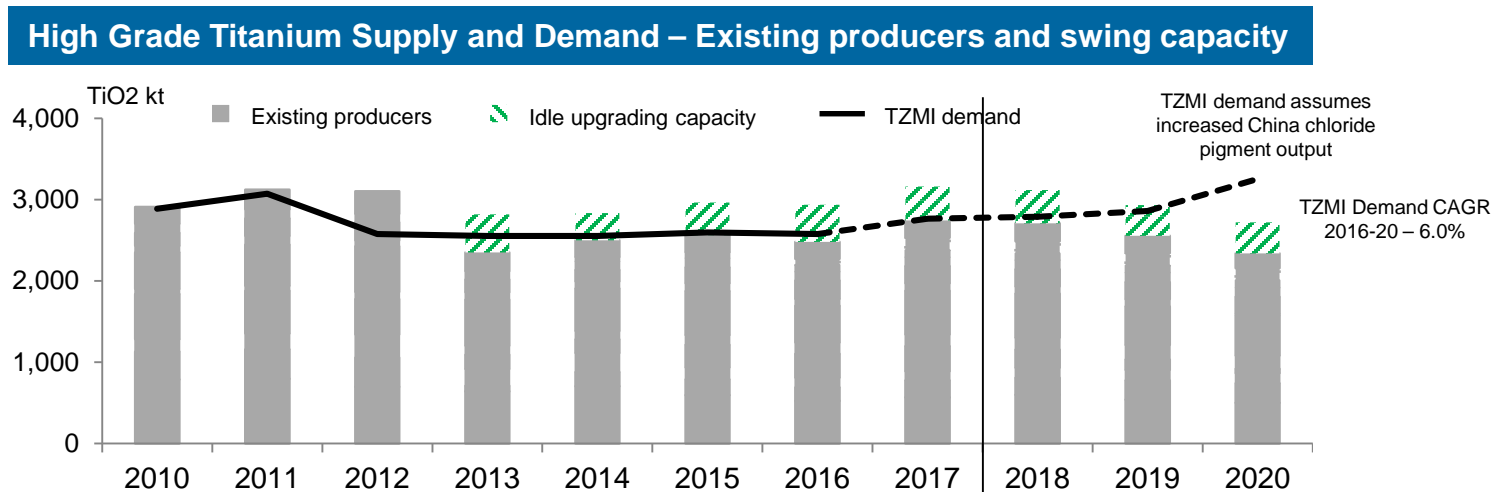
- Positive conditions in downstream pigment market (90% of demand)
- Pigment plant closures in EU and China increasing utilisation of plants in operation
  - high grade feedstocks used to increase yields
- Pigment prices up 55% from market low (Oct 2015)
- Rutile prices up 28% from market low (Q4 2016)
- Pigment and feedstocks price growth over past 12 months comparable
- Historical lag of 6-12 months to feedstocks prices
- Rutile historically priced at premium to other high grade feedstocks
  - reflecting relative economic value, other factors
- Rutile price growth has been greater than other high grade feedstocks, increasing price differential
- Key drivers of further rutile price growth are other high grade feedstock prices, pigment prices, feedstock availability and specific pigment plant capabilities





# High Grade Titanium Dioxide Supply/Demand

- Supply–demand overlaid with swing capacity not requiring additional mine investment
- Subject to price rises inducing brownfields investment, the high grade market has sufficient supply capacity to meet demand to 2019
  - This idle capacity has existed for five years, with major producers exhibiting supply discipline
- Between the three major producers, there is sufficient capacity and feedstock supply to fill the emerging gap
- If all potential suppliers enter the market, the high grade market would have ample supply capacity
- Highlights importance of Iluka's strategy to secure offtake for Cataby project



This slide should be read in conjunction with the disclosure in respect of forward looking statements on slide 2  
 Source: Iluka supply and TZMI demand August 2017

# Industry Challenges Of Current Market



Although substitutes exist, zircon is the better product

## Zircon attributes

- Opacity – whiteness
- Hardness
- Low thermal expansion
- High melting point
- Thermal conductivity
- Chemically inert
- Low neutron absorption



- Alumina
- Feldspar
- Kaolin
- Chromite
- Synthetic Mullite

Adoption of substitutes has value-in-use and technical limitations



# Substitution Landscape

Market	Application	% of zircon market (est)	Major Substitute	Adoption Hurdle	Mitigation
Ceramics	Body	16	Calcined alumina; white clays; white feldspar; kaolinite	Medium	<ul style="list-style-type: none"> <li>Alumina content in tile formulation</li> <li>Final product attributes (e.g. porosity, dimensions)</li> <li>Declining availability and quality of ceramic clay and feldspar deposits</li> </ul>
	Engobes & glazes	27	Calcined alumina	Medium /High	<ul style="list-style-type: none"> <li>Alumina content in tile formulation</li> <li>Final product performance (e.g. water mark, meltability, chemistry, gloss)</li> <li>Increasing demand for higher-quality and HD digital glazed tiles</li> </ul>
	Ceramic frits	9	Nil	High	<ul style="list-style-type: none"> <li>Zircon's effects unmatched by any substitutes</li> </ul>
Chemicals	Pigments (zirconia)	20	Nil	High	<ul style="list-style-type: none"> <li>ZrO<sub>2</sub>'s effectiveness to provide crystal encapsulation for specific colours</li> </ul>
	Medical Applications		Nil	High	<ul style="list-style-type: none"> <li>Highly specific functions</li> </ul>
	Advanced materials		Nil	High	<ul style="list-style-type: none"> <li>Highly specific functions (e.g. fuel rods, oxygen sensors, high-temperature turbine coatings)</li> </ul>
Refractory	Glass refractory	16	Nil	High	<ul style="list-style-type: none"> <li>Highly specific function</li> <li>High-impact failures if cheaper substitutes fail</li> </ul>
	Steel refractory		High-purity alumina; spinel	Medium /High	<ul style="list-style-type: none"> <li>High-impact failures if cheaper substitutes fail</li> </ul>
Foundry	Sand-casting	2	Synthetic mullite; chromite	Low	<ul style="list-style-type: none"> <li>Limitation in performance of substitutes (e.g. desired high-level surface finish and chilling effects)</li> </ul>
	Coatings	10	Alumina; synthetic mullite	High	<ul style="list-style-type: none"> <li>Limitations in performance of substitutes (e.g. high refractoriness and resistance to molten metal)</li> </ul>
	Precision Casting		Fused silica; WFA; synthetic mullite	High	<ul style="list-style-type: none"> <li>Limitations in performance of substitutes (e.g. surface finish quality, coating slurry instability)</li> </ul>

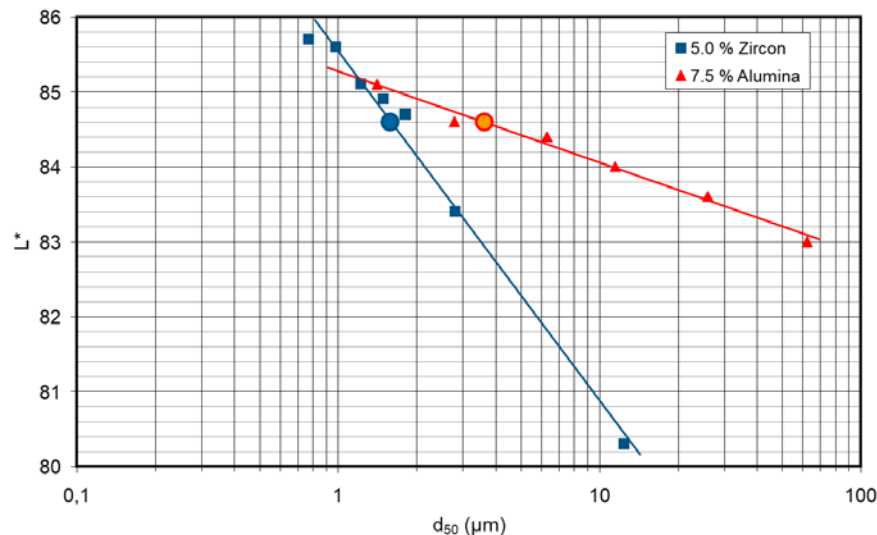
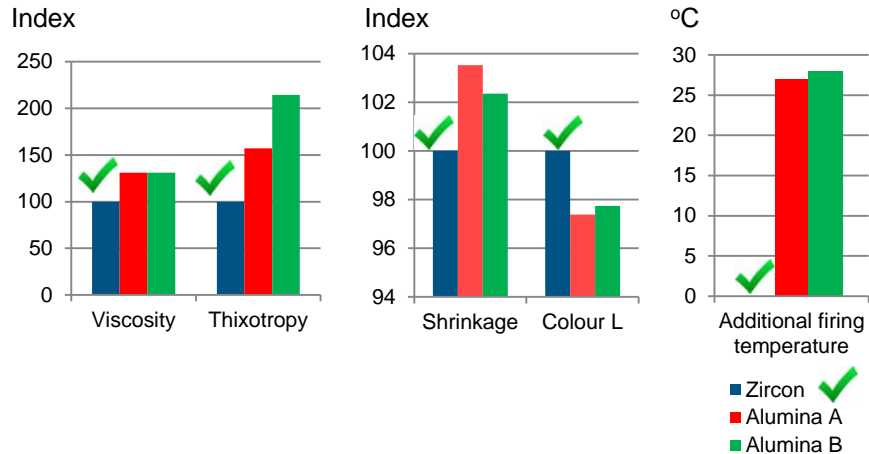
Adoption  
Hurdle

Low = Likely requires only in-house competencies to trial and implement the change. Change could likely be achieved in less than a year. Low economic risk.

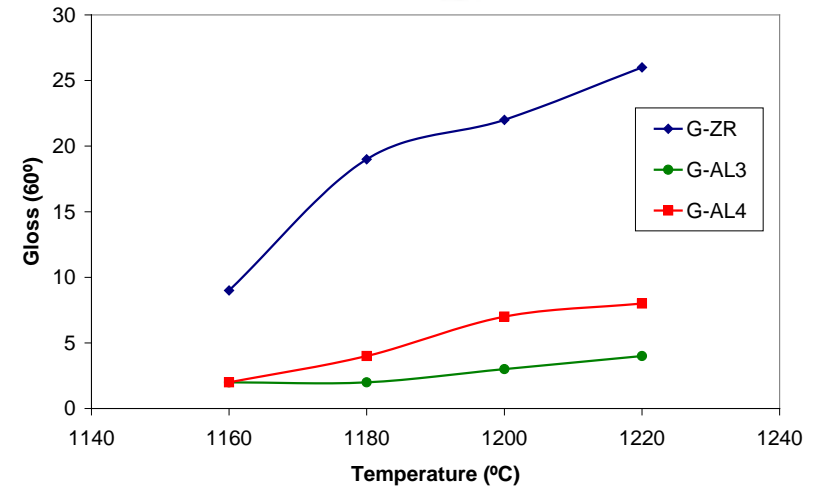
Medium = Focussed effort needed, external specialist knowledge may be required. Change may require between one to three years.

High = Technical limitations, Deep and specialised technical knowledge to study, trial or implement the changes. May require more than three years of efforts. High potential economic risk from any trials.

# Zircon vs Alumina - Technical Attributes



Evolution of  $L^*$  coordinate with the opacifier particle size for porcelain tile body compositions with 5.0 % of zircon and 7.5 % of alumina.



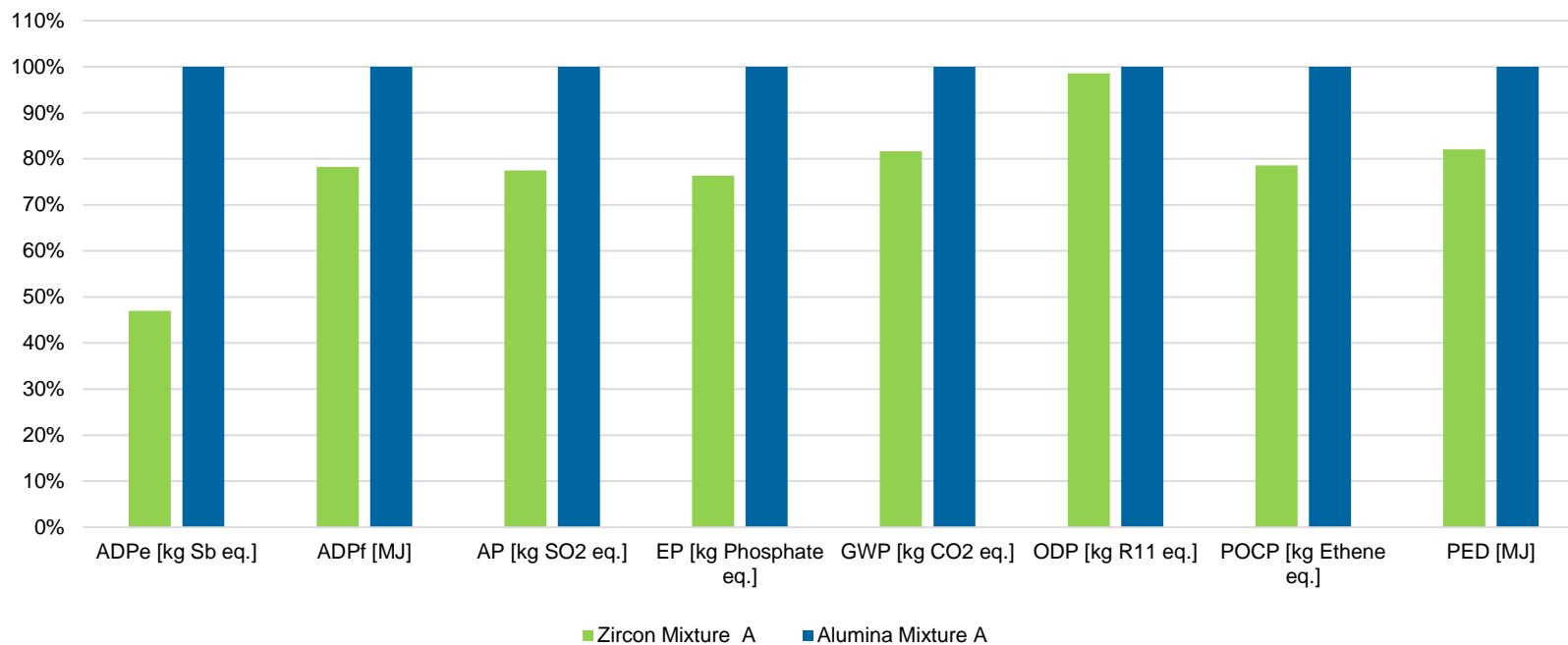
Glaze Gloss vs. Temperature

- No viable substitutes today for zircon-based white frits
- Substitution in porcelain bodies leads to issues in rheology, shrinkage, increase in firing temperature, lower whiteness
- Alumina requires higher substitution ratio (60%+ addition)
- Performance gap between zircon and alumina gets wider as particle sizes go down
- Zircon is the best opacifier for producing high gloss tiles

# Zircon vs Alumina - Environmental Footprint

## Zircon has a lower Environmental Footprint

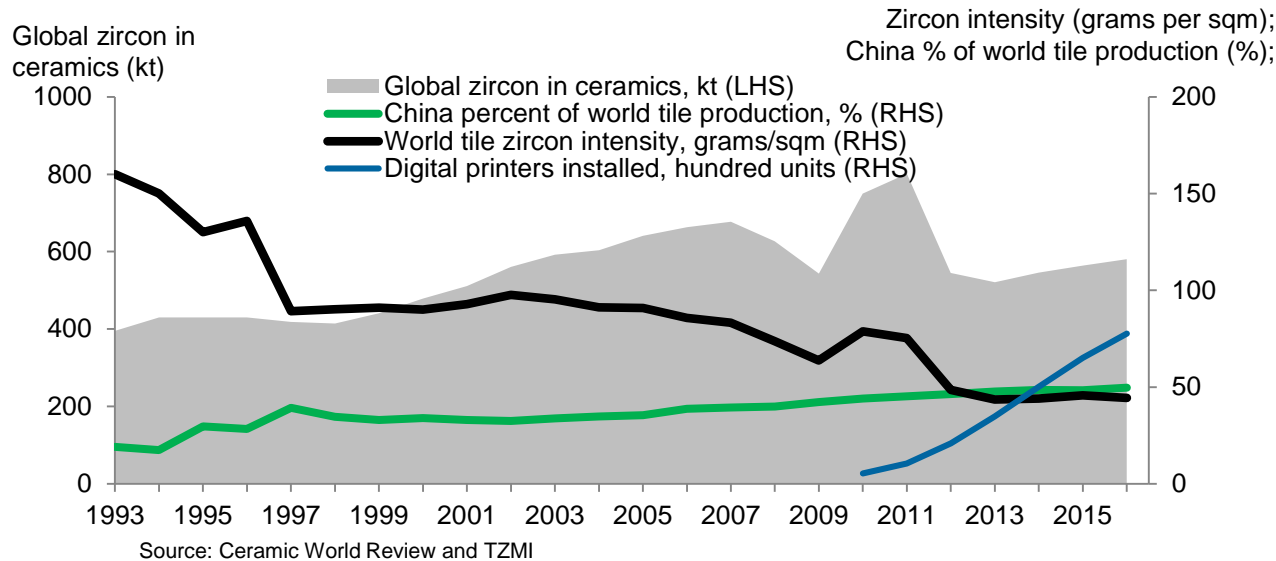
### Ceramic Tile Mixture A



Source: Ruidow Global Zircon Conference 2018's presentation by ZIA (2018);  
Life Cycle Analysis by ZIA

# Zircon Facilitates New Ceramics Design and Applications

## Zircon is a key enabler to new trends in ceramic designs



## Latest Tile Formats

### Digital Glazed Porcelain

Better glazes and designs  
High growth category



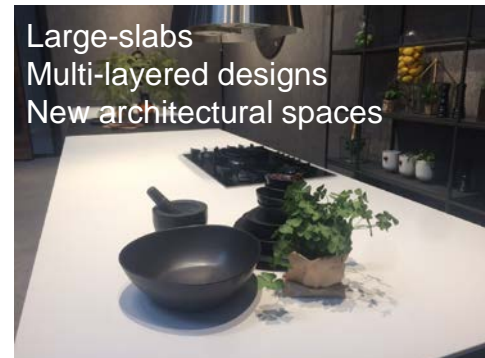
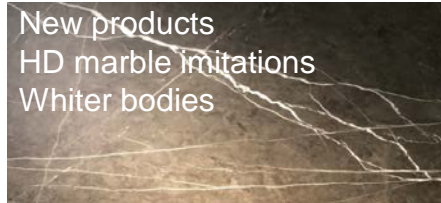
### Glazed Ceramic

Digital printing  
Greater design options  
Stable demand



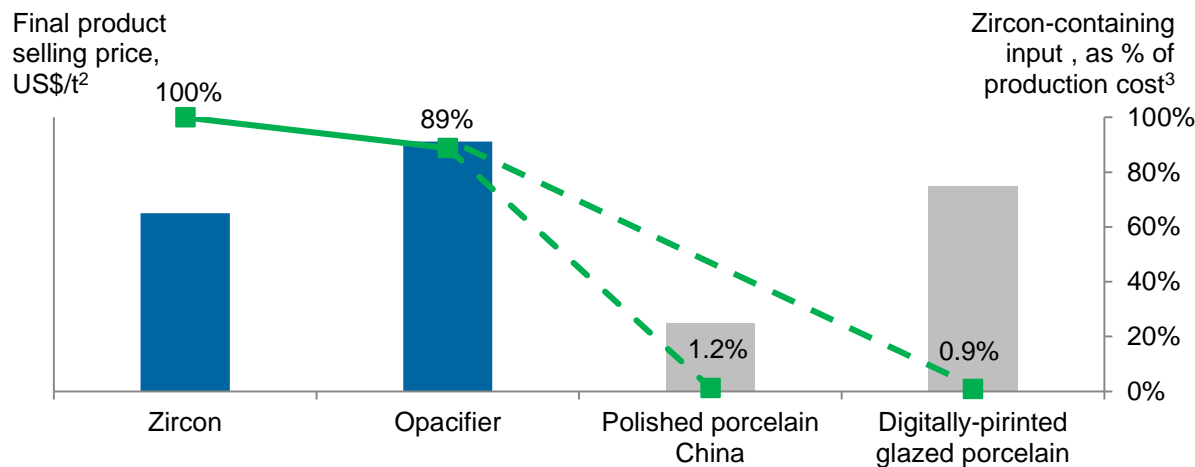
### Gres Porcelain

New products  
HD marble imitations  
Whiter bodies



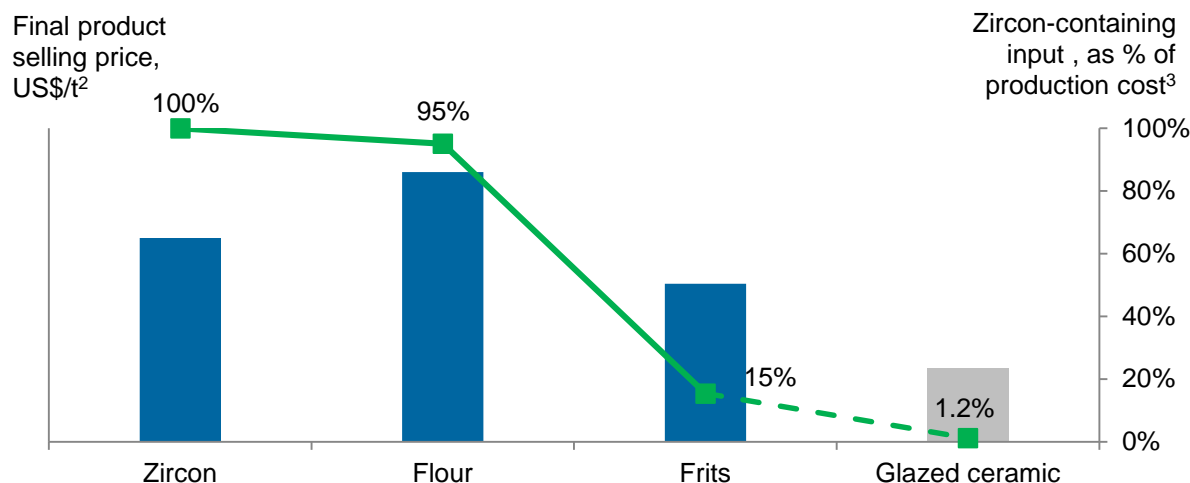


# Tile Production Costs



## Cost of zircon in end-use products

Polished porcelain	1.2%
Digital glazed porcelain	0.9%
Glazed ceramic	1.2%



Source: Iluka study of selected tile production region in Asia.

1. The supply of Zircon is inextricably linked to the supply of Titanium

2. A challenge for the industry is maintaining sustainable pricing outcomes through the value chain

3. Zircon does have some substitutes but adoption hurdles are high and there are real risks to end product performance



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## For more information contact:

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