



# Addressing the Deficit

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13 November 2018



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# Key Messages



**Supply-demand for high grade chloride feedstocks and zircon to remain in structural deficit**



**Iluka is taking action to support its customers**



**Iluka has a pipeline of projects – many of which are scalable**







## Iluka's View of the Market



# Supply-Demand Fundamentals – Zircon



## Global Zircon Supply

- Significant inventory depletion in recent years
  - 2016-18 supply = production + inventory
- Existing producers' mines are mature
  - entering decline in coming years
- 2019 market expected to remain tight
  - Indonesia, Iluka ZIC balancing market
  - minor new supply (concentrate)

## Global Zircon Demand

- Small changes in market eased Q3 tightness
- Q4 Chinese demand likely to be subdued
  - difficult conditions in Chinese tile industry
  - solid demand in sanitary and refractory
  - Iluka sales not affected
- Less speculation evident in opacifier pricing
- Iluka's customers have positive 2019 outlook
  - customers seeking more volume
- Longer term demand growth outpacing supply



# Supply-Demand Fundamentals – High Grade Titanium Dioxide Feedstocks



## Global High Grade Feedstock Supply

- Production disruptions have reduced supply in 2018 and contributed to tight market
- No rutile inventory reported through chain
- All Iluka 2018 volume contracted or allocated
- Iluka rutile sales limited by production
- Downstream concerns for feedstock availability in 2019 and beyond

## Global High Grade Feedstock Demand

- High level of pigment plant utilisation
- Reduced pigment prices in some regions
  - Follows period of strong growth
- Pigment producers understood to be rebuilding inventory
  - Supporting feedstock demand
- Long term growth of chloride pigment capacity exceeding feedstock supply



# Industry Response

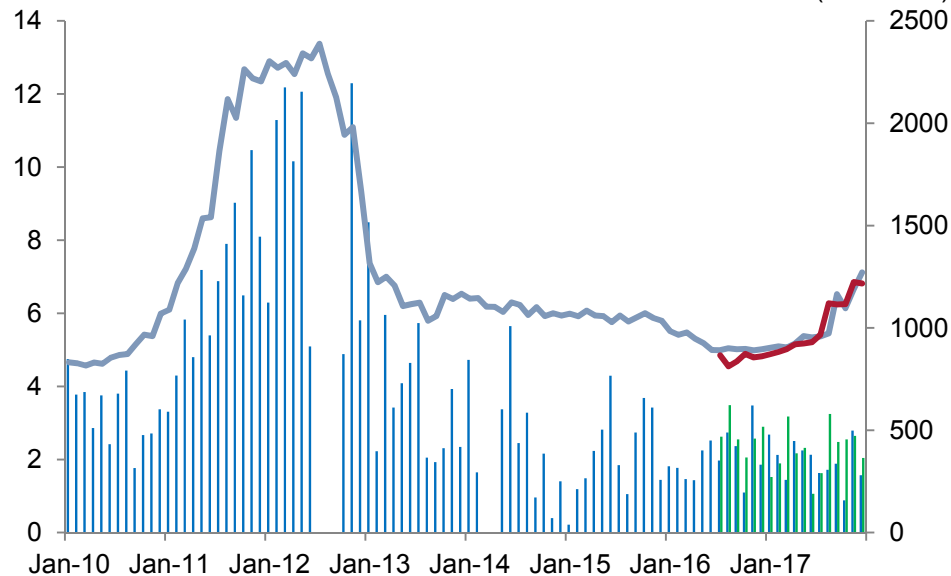


- Titanium Feedstocks - limited response to shortage
- Zircon - aside from Iluka, industry response to date limited to Kalimantan

## Indonesian Exports – Total and to China

### 2010 to 2017

Zircon sand and concentrate equivalent (kt)

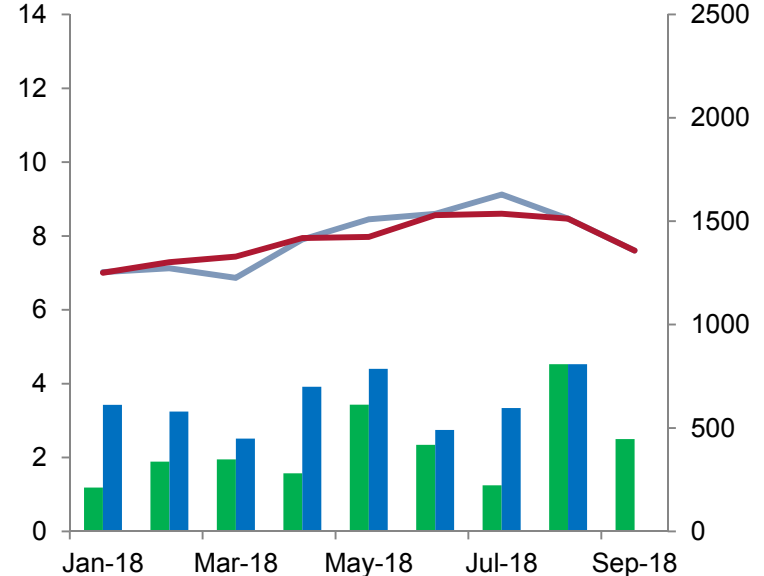


■ China imports from Indonesia  
— China import price (US\$/t CIF)

Source: Iluka, TZMI, Export Genius

### Detailed 2018 year to date

Zircon sand and concentrate equivalent (kt)



■ Indonesia export volume  
— Indonesia export price (US\$/t FOB)

- Inducement price for Kalimantan exports generally regarded to be ~US\$1,400/t
- Indonesian exports currently ~50ktpa rate



# Addressing the Deficit for Customers

- Zircon market tightness eased in late 3Q; underlying structural deficit remains
- Iluka can continue to release additional ZIC to assist customers / market
- Project initiated to scope SR1 re-start to supply high-grade synthetic rutile
- Will continue to apply lessons of the past in product pricing strategy
- Executing projects for short term
- Progressing pipeline of projects for medium to longer term

|  | Project                      | Zr | R | Ilm <sup>1</sup> | SR |
|--|------------------------------|----|---|------------------|----|
| <b>Execute</b><br>(projects underway)                | Ambrosia mine move           | ✓  |   | ✓                |    |
|  | Cataby development           | ✓  | ✓ | ✓                | ✓  |
|  | ZIC release                  | ✓  |   |                  |    |
|  | Lanti and Gangama expansions |    | ✓ | ✓                |    |
| <b>Evaluate</b><br>(projects in scoping / PFS / DFS) | SR1 restart                  |    |   |                  | ✓  |
|  | Balranald                    | ✓  | ✓ | ✓                |    |
|  | Sembehun                     |    | ✓ | ✓                |    |
|  | Fine Minerals <sup>2</sup>   | ✓  | ✓ | ✓                |    |
|  | Other deposits <sup>3</sup>  | ✓  | ✓ | ✓                | ✓  |

1. Some ilmenite could be used as SR feed. 2. Also includes rare earth co-product. 3. Atacama, Euston, South west deposits, IPL north, Puttalam



# Iluka's Production Response

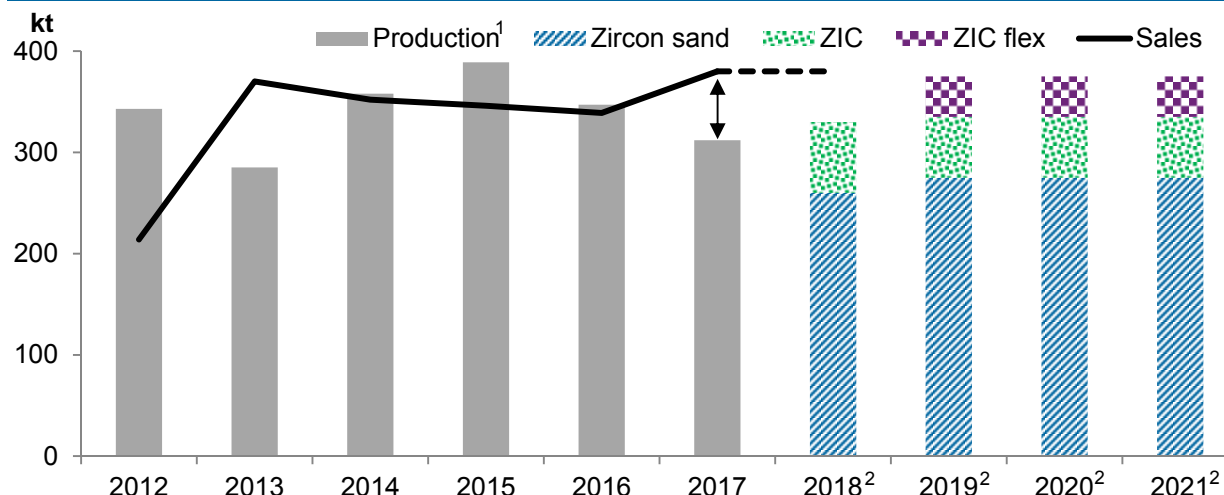


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Cataby, Western Australia

## Iluka's Zircon Production and Sales



## Iluka's response to tight market conditions<sup>3</sup>:

- Guided 2018-2021 zircon production of ~335ktpa
  - Cataby project tonnes available in 2019
  - early Ambrosia mine move (smoothing production)
  - Incl. ~20% zircon in concentrate (ZIC) from multiple sources
- Potential for additional ZIC production ~40ktpa from Narngulu
- Gap filled by inventory release in 2017 and 2018, return to normal inventory levels in 2019

1. Production denotes finished zircon product (includes ZIC)

2. 2018-2021 production guidance of 335ktpa and 2018 sales assumes 2018 H1 and H2 sales evenly weighted, as guided

3. All outlook production figures are expected annual average 2018-21, subject to market conditions



## Iluka Projects Underway



Cataby, Western Australia



# Cataby Development On Track

- Progress on track and within budget
  - site foundation works well advanced
  - planning for commissioning of mining unit
  - mining contractor removing overburden and has commenced mining ore
  - concentrator plant and equipment erected
- Total capex tracking within guided range of \$250-275 million
- Access to additional ore reserves could extend life by 4 yrs

| Average Annual Production   |           | 2019-2022  | 2023-2026  |
|-----------------------------|-----------|------------|------------|
| Zircon                      | kt        | 60         | 40         |
| Rutile                      | kt        | 35         | 25         |
| Synthetic Rutile (SR2 kiln) | kt        | 200        | 200        |
| <b>Total Z/R/SR</b>         | <b>kt</b> | <b>295</b> | <b>265</b> |
| Ilmenite                    | kt        | 440        | 320        |

| 2018    | 2019 | 2020                          | 2021 | 2022 | 2023                          | 2024 | 2025 | 2026 | 2027   | 2028 | 2029 | 2030 | 2031 |
|---------|------|-------------------------------|------|------|-------------------------------|------|------|------|--|------|------|------|------|
| Execute |      | 1 <sup>st</sup> kiln campaign |      |      | 2 <sup>nd</sup> kiln campaign |      |      |      | 4 year extension possible, subject to access and approvals |      |      |      |      |

Note: Timing is approximate



# Ambrosia Early Mine Move



- As announced, the Iluka Board has approved accelerated mine move to Ambrosia
- The mine move is expected to be completed by October 2019 (previously 2022)
- Capital expenditure of ~\$35 million in 2019
  - deferred capital of ~\$20 million cost over 2020-21 for tailings management
- Expect similar production levels to current operations in early years of Ambrosia
- Ambrosia mining supplemented with heavy mineral concentrate stockpile from Jacinth

Early works underway, road to Ambrosia



# ZIC Production Potential<sup>1</sup>

- Produced by upgrading / blending current and stockpiled MSP byproduct streams
- Simple reclaim with minimal processing and low cost
- Match production / sales to market

## Iluka's ZIC sources

- US: almost depleted
- South west: +2 years remaining
- Sierra Rutile: ongoing for life of mine
- Narngulu: ongoing
  - stockpile of ~600kt
  - base production of ~40-50ktpa
- Provides flex of up to ~40ktpa

Mineral Processing Unit, Narngulu (90ktpa capacity)



1. Zircon in Concentrate recognised as production upon sale. All tonnages refer to contained zircon in zircon in concentrate. All tonnages are annual averages.


# Increasing Rutile Production Capacity

## SRL Expansions

- Lanti dry and Gangama mine expansions progressing on track
  - engineering, procurement and construction contractor mobilised to site
  - earth moving vehicles delivered
  - civil construction and equipment manufacturing on schedule
- More than offsets cessation of dredge mine

Gangama DM2 expansion site



| Concentrator <sup>1</sup> | 2017                 | 2018 | 2019                     | 2020 | 2021 | 2022   | 2023 |
|---------------------------|----------------------|------|--------------------------|------|------|--|------|
| DM1                       | Lanti dry 500-600tph |      | Lanti dry 1,000-1,200tph |      |      | <br>Near mine<br>exploration <sup>2</sup> |      |
| DM2                       | Gangama 500-600tph   |      | Gangama 1,000-1,200tph   |      |      |  |      |

Note: Mining rates dependent on spiral plant feed

1. Rates refer to tonnes per hour (tph) ore feed rate and are an indicator of capacity of each concentrator and not expected production.

2. Extension of DM1 + DM2 dependent on further study of near mine exploration potential. DM1 Production to 2027 includes approximately 12% Inferred Mineral Resource and 6% Exploration Target. DM2 Production to 2027 includes 5% Inferred Mineral Resource. While the Exploration Potential is hosted in the same geological setting as historically mined material, the production forecast from near mine exploration potential is based on a number of assumptions and limitations with the estimated grade and quantity being conceptual in nature. It is uncertain if future exploration will result in the estimation of a Mineral Resource or Ore Reserve. The Ore Reserves, Mineral Resources and Exploration Targets underpinning the Production Targets have been signed-off by the Competent Person in previous releases to the ASX: Updated Mineral Resources and Ore Reserve Statement, dated 20 February 2017 and Sembehun Mineral Resource Increase and Pejebu Exploration Target, Sierra Rutile, dated 15 August 2018. There is a low level of geological confidence associated with inferred mineral resources and there is no certainty that further exploration work will result in the determination of indicated mineral resources or that the production target itself will be realised. The potential quality and grade of an exploration target is conceptual in nature, there has been insufficient exploration to determine a mineral resource and there is no certainty that further exploration work will result in the determination of mineral resources or that the production target itself will be realised.

# Utilisation of Synthetic Rutile Capacity

## SR1 Restart

- ~120ktpa of synthetic rutile production capacity
- Commenced scoping study for restart
- Assessing optimal feed sources – internal and external
- Subject to relevant approvals

Synthetic rutile kiln in operation, Capel Western Australia







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## **Iluka's Medium Term Projects**





# 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

# Fine Minerals



- Conducting pre-feasibility study on development of WIM deposits in western Victoria
- Underlying challenges of deposits
  - recovery of fine sized minerals
  - zircon product eligibility for ceramic market
  - monetizing rare earth co-product
- Strategic rationale of development
  - large, long life deposits
  - close to infrastructure
  - new source of zircon
  - diversification to rare earths

## Rare Earth Elements

The assemblage of each rare earth deposit is different and some elements are more common than others. Iluka's current focus is a deposit with high value elements, including Neodymium, Dysprosium, Terbium and Praseodymium, commonly used in permanent magnets, such as in electric cars, wind turbines and consumer electronics.





# Balranald



## Project Overview

- Large, deep, high grade rutile-rich deposit with ilmenite and zircon production
- Progressing scalable, underground mining method
- Third field trial deferred pending drilling programme results

## Project Update

- Drilling programme completed
  - sonic drilling technique (previously drilled with air core drilling)
  - provides more accurate and detailed mineralisation and deposit delineation
  - results being compiled and will form basis of future plans



# Sierra Rutile Sembehun Development



- Sembehun group of deposits are more than 70% of remaining Sierra Rutile ore reserves
- DFS underway
- Value optimisation work continues
  - Sembehun early works schedule compressed following initial project re-evaluation







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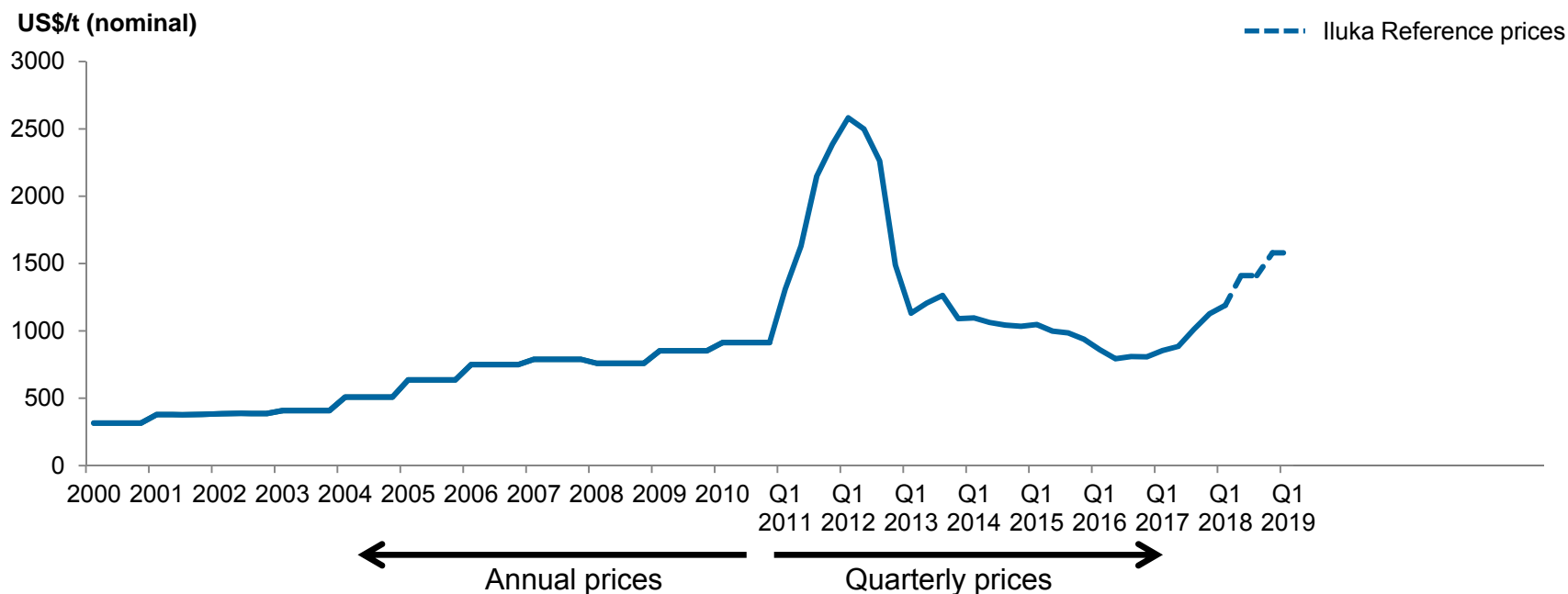
**Where to next for prices?**



# Iluka's Approach to Pricing

- Iluka approaching pricing decisions mindful of history
- Current price appropriate given:
  - market conditions
  - customers' capacity to pay
  - sustainable returns
- Industry participants will influence what happens next

## Zircon Price History



# Key Messages



**Supply-demand for high grade chloride feedstocks and zircon to remain in structural deficit**



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