# Resources Limited

#### DEVELOPING STRATEGIC HIGH PURITY ALUMINA (HPA) CADOUX KAOLIN PROJECT IN WESTERN AUSTRALIA NWR Virtual Resources Conference - May 2020

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#### COMPETENT PERSONS' STATEMENTS

#### **Ore Reserves**

The information in this report that relates to Ore Reserves is based on information compiled by Mr. Steve Craig, who is a Fellow of the Australasian Institute of Mining and Metallurgy. Steve Craig is a full-time employee of Orelogy Consulting Pty Ltd and has sufficient experience relevant to the style of mineralisation and type of deposit under consideration and to the activity which they are undertaking 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". The information is extracted from the Ore Reserve announcement released within the DFS announcement 11 March 2020 and is available to view on the Company's website at www.fyiresources.com.au

#### **Mineral Resources**

The information in this report that relates to Mineral Resources is based on information compiled by Mr Grant Louw, under the direction and supervision of Dr Andrew Scogings, who are both full-time employees 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". The information is extracted from the PFS announcement dated 25 September 2018 and is available to view on the Company's website at www.fyiresources.com.au

#### Metallurgy

The information in this report that relates to metallurgy and metallurgical test work is based on information reviewed and compiled by Mr Daryl Evans, a Competent Person who is a Fellow of the Australian Institute of Mining and Metallurgy (AusIMM). Mr Evans is an employee of Independent Metallurgical Operations Pty Ltd, and is a contractor to FYI. Mr Evans has sufficient experience that is relevant to this style of processing and type of deposit under consideration, and to the activity that he has undertaken to qualify as a Competent Person as defined in the 2012 Edition of the "Australasian Code for the Reporting of Exploration Results, Mineral Resources and Ore Reserves". Announcements in respect to metallurgical results are available to view on the Company's website at www.fyiresources.com.au.

#### General

The Company confirms that it is not aware of any new information or data that materially affects the information included in the original market announcements and that all material assumptions and technical parameters underpinning the findings in the relevant market announcements 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 announcements.

#### Introduction

High Purity Alumina

Key Achievements

HPA Growth and Key Markets

Cadoux Highlights

Production and Flowsheet Innovation

Customer Engagement

Kwinana – Battery Alley

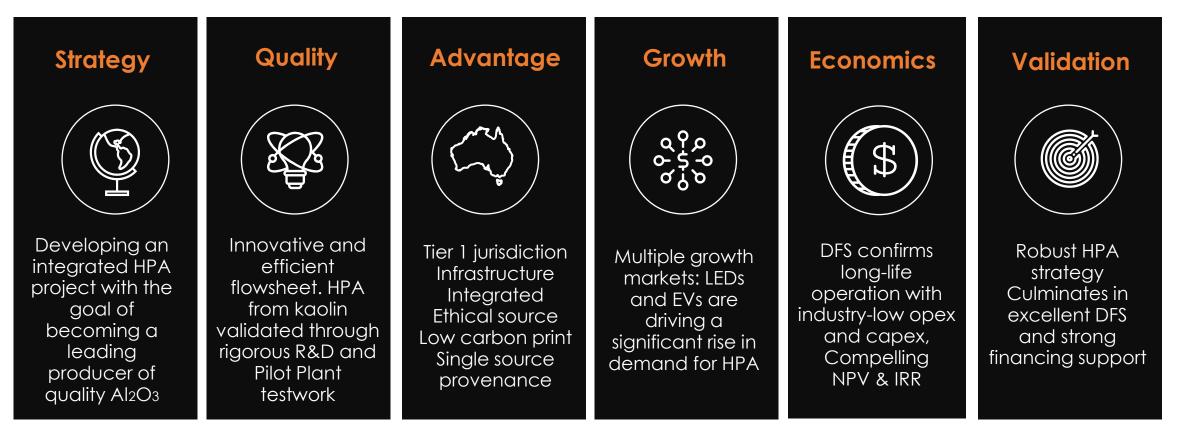
Project Delivery Timeline

DFS Summary Metrics

AGENDA

## **INTRODUCING FYI RESOURCES**

#### FYI is on-track in delivering on its stated HPA development objectives



FYI IS AIMING TO BECOME A DOMINANT PARTICIPANT IN THE GLOBAL HPA MARKET

### **KEY ACHIEVEMENTS**



DFS confirms Cadoux as a worldclass HPA project



Pilot plant success validates and derisks the project



Process flowsheet optimised to increase efficiencies + reduce Capex & Opex



Project Reserves\*\* providing > 50 years mine-life



Metallurgical results exceeded 99.99% target HPA\*

Kwinana "Battery

Alley" refinery site

approved



Mining Lease granted and permitting completed



Focused on fast-tracking development and construction



Initiated HPA offtake negotiations with potential customers



Major strategic financing arranged. Negotiations for balance of project funding is underway



# HIGH PURITY ALUMINA (HPA)



HPA is a processed, premium, non-metallurgical alumina product characterised by its purity level – i.e. 99.99% (4N), 99.999% (5N).



HPA is mainly used for its superior properties, such as corrosion and scratch resistance, high brightness, and its ability to withstand extreme temperatures.



Currently HPA is sourced from expensive feedstock, such as refined aluminium metal sourced from bauxite using antiquated processing. FYI plans to produce low-cost HPA from kaolin using innovative processing methods.



Applications include: LEDs; in the manufacture of artificial sapphire glass; in certain battery and static power storage components; aeronautical and medical applications.

# HPA MARKET OVERVIEW

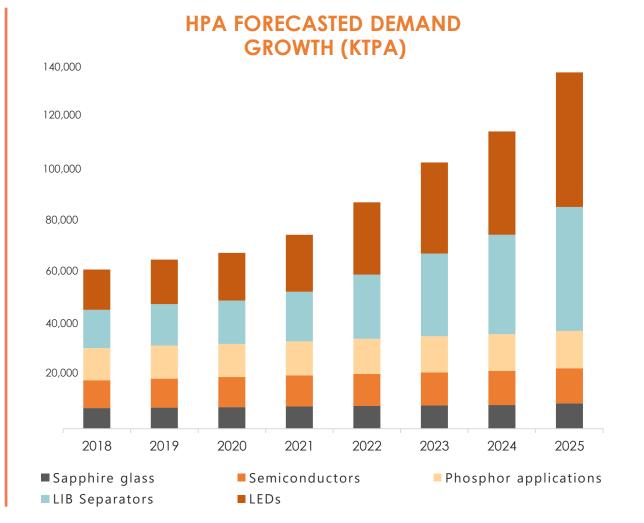
#### HPA FORMS A SIGNIFICANT PART IN **HIGH-PERFORMANCE ELECTRONICS**

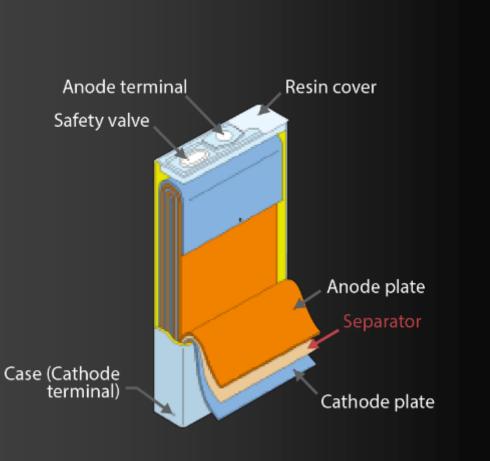
Historically a small market – no justification for product innovation

New applications and technologies have created demand and market opportunities

The current global 4N HPA market demand is ~60ktpa; this is expected to increase to ~90ktpa by 2022 and >130ktpa by 2025\*

The market for HPA is witnessing dramatic consumer driven growth, with the HPA market forecasted to be US\$4.49Bn by 2022\*\*





CROSS-SECTIONAL VIEW OF LITHIUM-ION BATTERY

#### HPA MARKET OVERVIEW



LEDs (Sapphire substrates) for household lighting



Lithium-ion battery separator coating



Scratch-proof glass for tablets and smartphones

Phosphor coating for fluorescent lighting

## **GROWTH MARKETS - LED**

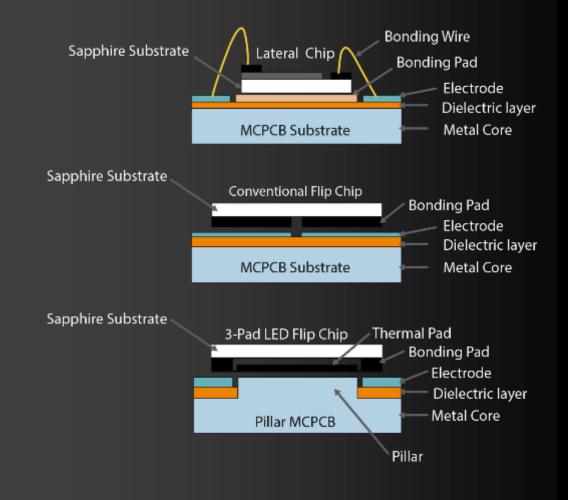
#### HPA demand is growing dramatically, underpinned by two key markets:

Traditional (LEDs, e-screens, electronics, etc) Batteries and static power storage (EV's, power walls)

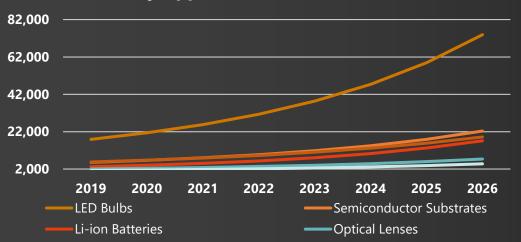
#### Growth is driven in combination by:

Government greenhouse emissions and energy targets Consumer led demand

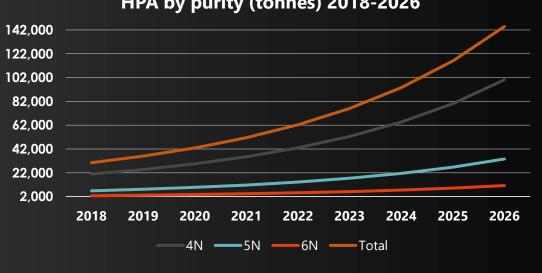
# Cross-Sectional view of various LED designs



## **ELECTRIC VEHICLE ADOPTION EXPANDING**



#### HPA by Application (tonnes) 2018 - 2026



#### HPA by purity (tonnes) 2018-2026

Electric Vehicle sales continue to grow worldwide, increasing by ~59% per annum since 2014 to over 2 million units sold globally in 2018\*

China currently leads the way with EV adoption through positive government incentives. Europe and the US are beginning to implement similar policies

EV capabilities are expected to expand to larger vehicles including SUVs as international automakers shift their strategy towards electric vehicles

High purity alumina demand will continue grow as it remains a key part of a functional lithium-ion battery

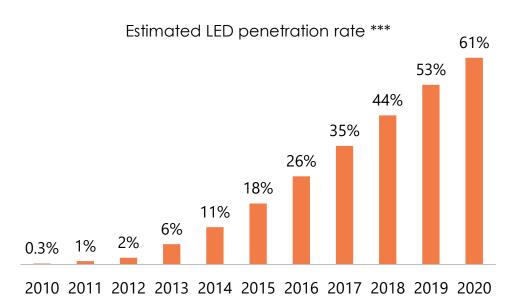
There is still significant growth to come, with EVs representing only 2.2% of global vehicle sales worldwide\*

# LIGHTING MARKET SHIFTING TO LEDS

Increasing environmental awareness and strict Government emissions targets and policies driving a shift towards LEDs in the lighting market

- Old, expensive and inefficient lighting applications are being legislated out
- LED market is forecast to grow to US\$54bn by 2022 and take the major share of the US\$110b global market\*
- High purity alumina is a core part of LEDs and cannot be replaced, the lighting market is expected to provide long-term upticks in demand for HPA as it continues to shift towards LEDs
- LED majors are located in several of FYI's key customer engagement locations, including China, Korea and Japan

#### Demand for HPA for use in LEDs is expected to reach 85,000 tonnes p.a by 2028 \*\* (total HPA demand in 2018 was 19kt)



## LONG PROJECT LIFE



The Cadoux Kaolin Project area boasts excellent infrastructure

**Deposit geology is ideal** – shallow, flat lying, low strip, free digging, homogenous excellent quality & easily accessible

Extensive drilling, **well understood geology -** detailed mine study completed, reserves calculated, first 3 years of grade control completed

Ideal characteristics quality, grade and low deleterious elements – extremely amenable to HPA processing

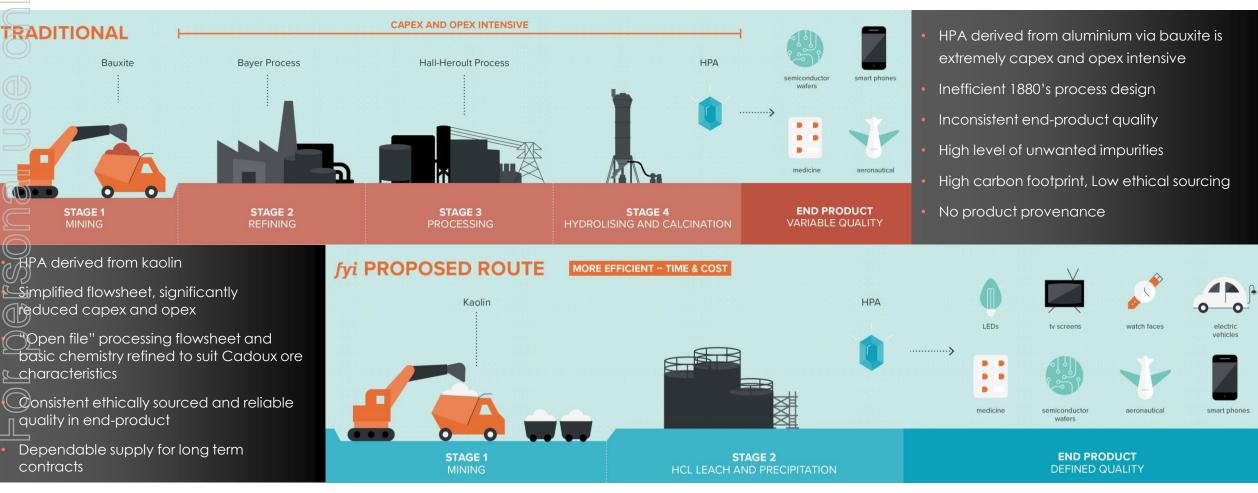
100% owned project area private land, no native title. **Permitting completed.** 

Resource supports > 100 years production / Reserve of 3.2 million tonnes grading 24.8% Al<sub>2</sub>O<sub>3</sub> supports DFS mine life of 25+ years



## INNOVATING HPA PRODUCTION

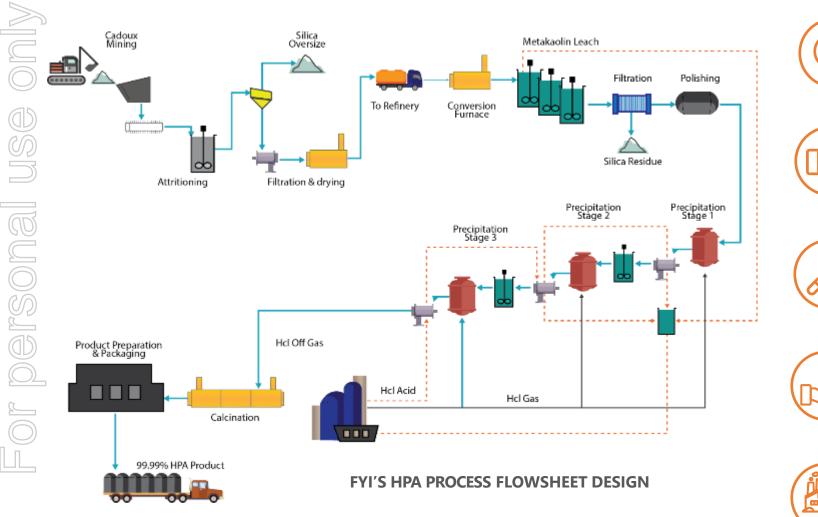




#### FYI'S INNOVATIVE METHOD

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## FYI'S SIMPLE & INNOVATIVE FLOWSHEET DESIGN



Developed for Cadoux's specific chemistry, quality and characteristics

Innova and Ic mainte

Innovative design - for efficiency and low opex (heavy duty, low maintenance and long life)

Successfully demonstrated high target grade purity and excellent process recoveries



Low environmental footprint, low carbon footprint, ethically sourced – key customer requirements



Processing plant planned for in Tier one location -Kwinana's 'Battery Alley'

## **DEVELOPMENT WORK & TECHNOLOGY DE-RISKING**

FYI has been undertaking detailed development works to further refine and de-risk the HPA process and design flowsheet:

- FYI's pilot plant has played a critical role in the validation and de-risking of our innovative HPA flowsheet
- Feedstock variability test work conducted in the pilot plant circuit produced assays from 99.997% -99.998% HPA, highlighting the efficiency and efficacy of the process flowsheet
- Locked Cycle test work achieved 99.999% alumina (5N)



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## STRONG FOCUS ON MARKET ENGAGEMENT

#### **PROJECT FUNDING STRATEGY**

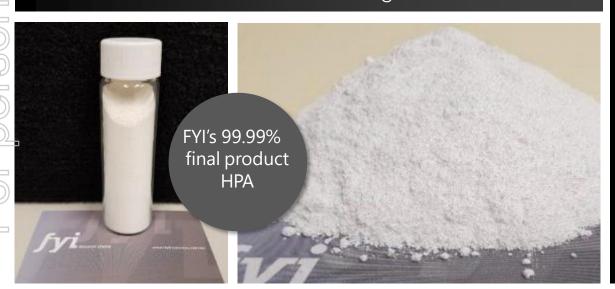
FYI is examining a number of funding options to finance its future activities and development costs. These include:

• Off-take

• Project debt

Equity

- Joint venture
- Cornerstone investor
- Strategic investor



#### FYI IS HEAVILY ENGAGED IN PRODUCT MARKETING AND OFF-TAKE

Strong focus on market engagement

Structured approach to achieving off-take and financing

Multiple rounds of meetings conducted (China/South Korea/Japan, Europe)

HPA trial product being sent by request to market participants (HPA customers, traders)

## KWINANA – BATTERY ALLEY

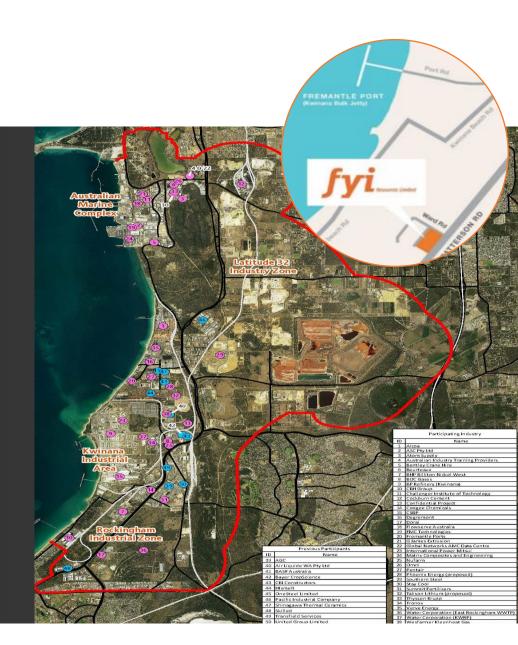
- FYI has secured a premium location in the highly sought-after Kwinana Industrial Area (KIA)
- The KIA is a strategic zone and a key contributor to the WA economy. The KIA is widely recognised as a first class manufacturing, engineering, chemical and resource processing and refining hub
- The KIA provides FYI with a world class processing and refining site where kaolin feedstock from Cadoux will be refined into HPA
- FYI may become an integrated proponent within the Kwinana Area and can contribute to, and leverage off, the leading technologies and services providers
- Integrated proponent companies located at the KIA include:
  - BHP

Bayer Corp

Alcoa

Wesfarmers

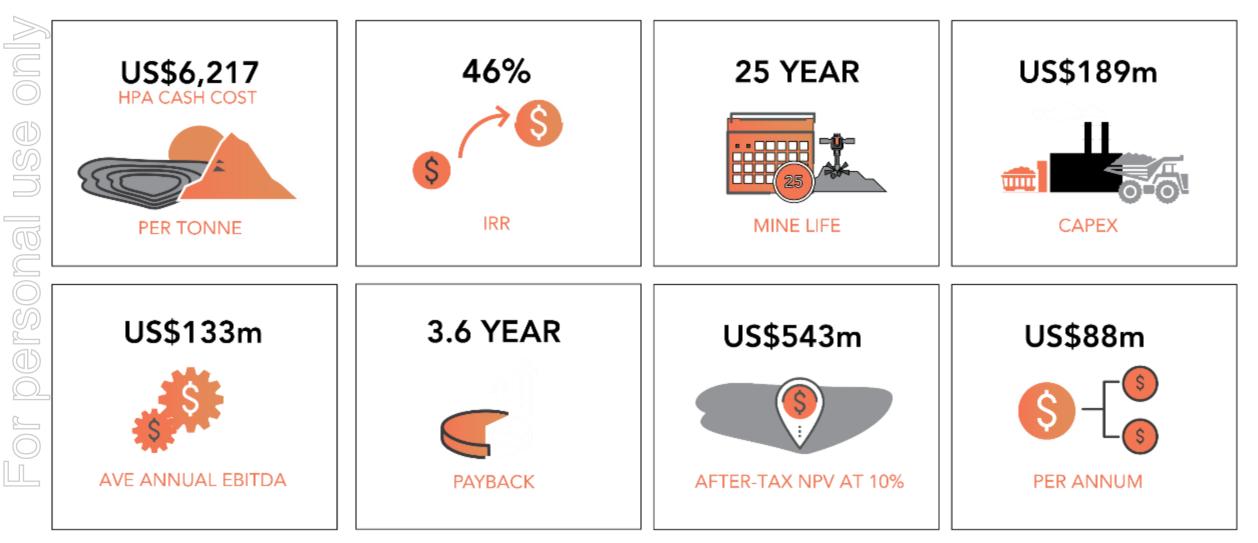
- BP
- Coogee Chemicals



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## DFS OUTSTANDING ECONOMICS METRIC SUMMARY



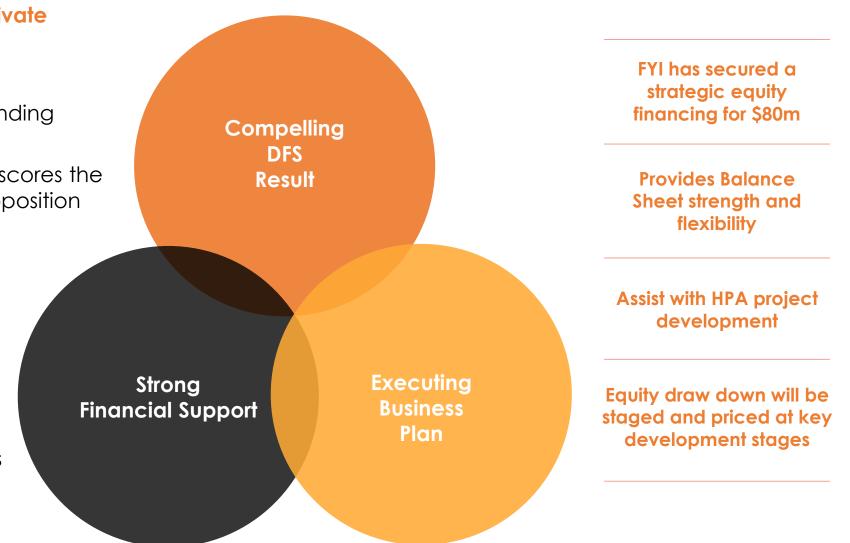
# MILESTONE STRATEGIC \$80m EQUITY FINANCING

# Arranged through European private equities group

- Long only fund
- GEM recognises FYI's outstanding DFS results
- GEM investment view underscores the projects long term value proposition

#### **GEM financing:**

- Addresses long term capital requirements
- Provides financial capacity for project development
- Adds leverage with other project funding negotiations
- Assists with working capital



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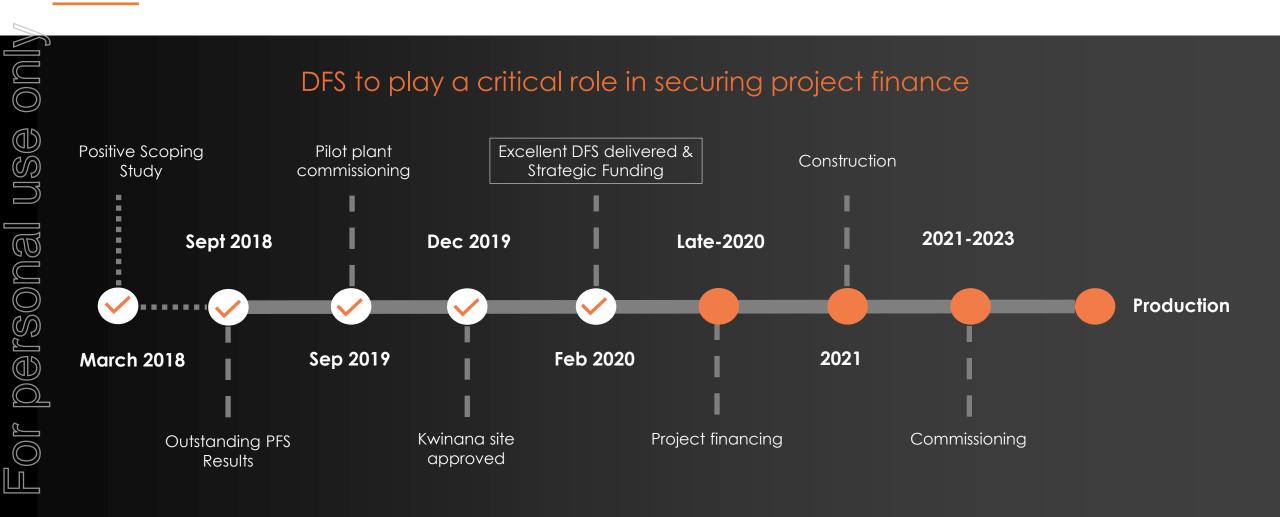
## CUSTOMER ADVANTAGES

- FYI embraces best practice approach to HPA project development
- FYI HPA has total provenance authentication and traceability of their 100% integrated process
- High environmental and social standards and governance
- HPA project developed to maximise green and sustainable practices
- Distinct environmental advantages over current traditional supply (Alkoxide bauxite / Aluminium)
  - Low environmental footprint
  - Reduction in raw material waste
  - Low toxic waste
  - Extensive recycling (inputs and outputs)
  - Approximately 50% reduction in greenhouse gas production / ton HPA
  - Approximately 40% reduction in processing energy consumption / ton HPA
- Contribute to clean and renewable industries (directly and indirectly)
  - Reduction in fossil fuel dependency
  - Reduction of carbon gas emissions
  - Supplier to other sustainable and environmentally conscious industries (EV, LED)



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## **PROPOSED PROJECT DELIVERY TIMELINE**



#### FYI SUMMARY

\$ Strategically funded and ersonal leveraged for growth Environmentally responsible, low carbon footprint, high product control and provenance



# fyi

#### FYI IS DEVELOPING A LONG-LIFE QUALITY HPA PROJECT

## FYI HPA - KEY DFS PROJECT ECONOMICS

ITEM	UNIT	AMOUNT
HPA production	Тра	8,000
Production grade	Al <sub>2</sub> O <sub>3</sub>	> 99.99%
Capital cost (capex)	US\$m	189
Dperating cost (opex)	US\$/t	6,217
Project NPV (@10%)	US\$m	543
Project IRR	%	46
Assumed HPA selling price / t	US\$/t	24,000
Annual revenue	US\$m	192
Operating margin	US\$/t	17,783
Annual EBITDA (avg)	US\$m pa	133
Total project revenue - life of project ( ~25 years)	US\$bn	4.7
Capital intensity	US\$/t	23,575
Project payback	years	3.6
Exchange rate	A\$:US\$	0.70

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