



ULTRA PURE –LOW CARBON
ALUMINIUM PRODUCTS
FOR
DE-CARBONISATION



Alpha **HPA**

ASX: A4N

Cautionary Statement

The Definitive Feasibility Study (DFS) referred to in this presentation has been undertaken to assess the technical and financial viability of the HPA First project. The DFS is based on the material assumptions about the availability of funding and the pricing received for HPA. While the Company considers all of the material assumptions to be based on reasonable grounds, there is no certainty that they will prove to be correct or that the outcomes indicated by this DFS will be achieved. To achieve the range of outcomes indicated in the DFS, additional funding will be required. Investors should note that there is no certainty that the Company will be able to raise the amount of funding when needed. It is also possible that such funding may only be available on terms that may be dilutive to or otherwise affect the value of the Company's existing shares. It is also possible that the Company could pursue other 'value realisation' strategies such as a sale, partial sale or joint venture of the HPA First project. If it does, this could materially reduce the Company's proportionate ownership of the HPA First project. Given the uncertainties involved, investors should not make any investment decisions based solely on the results of the DFS.

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Alpha HPA: Introduction

We are a technology/industrial chemical company

Direct exposure to the rapidly growing **Li-ion battery and LED lighting** markets

We do this through a suite of **ultra-high purity aluminium products** which are:

CRITICAL RAW MATERIALS FOR DE-CARBONISATION

Our proprietary process delivers us the competitive edge

HIGH PURITY/LOW CAPEX/LOW OPEX/LOW CARBON

We are commercialising our technology as the
HPA FIRST PROJECT

CONSTRUCTION UNDERWAY

Stage 1 PPF – 1st Commercial Production - **September 2022**

Stage 2 Full Scale HPA First Project - to free cash flows of between **A\$133 - \$280M pa** (DFS - March 2020)



**STAGE 1 - CONSTRUCTION UNDERWAY
A\$60M IN AUST GOVT GRANTS APPROVED**

- 10ha project site secured
- Stage 1 Construction underway – Completion September 2022
- Adjacent to Orica Australia to allow for Project Interface
- Definitive Orica Agreements executed



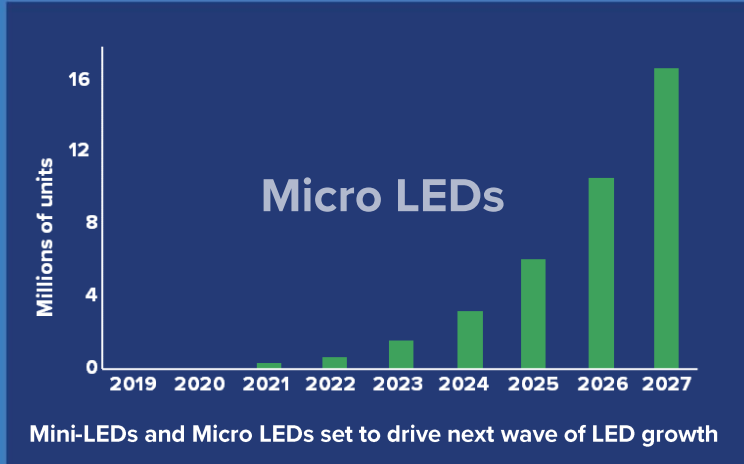
**HPA First Project Site
Gladstone State Development Area,
North Queensland**

HPA First Project: Location



LED-LIGHTING

The current technology driver of de-carbonisation



LEDs reduced CO₂e by an est. 570m tons in 2017

Reducing new power stations by 1,250

IN 2017, THE USE OF LEDS TO ILLUMINATE BUILDINGS AND OUTDOOR SPACES REDUCED CO₂ EMISSIONS BY NEARLY

570 MILLION TONNES

75%

PROJECTED ENERGY SAVINGS IN US LIGHT ENERGY CONSUMPTION BY 2035

LED lights are 50-70% more efficient than incandescent

A COMPLETE SWITCH TO LED LIGHTING WORLD WIDE, WOULD PREVENT 1,400,000,000 TONNES OF CO₂ EMISSIONS

ANNUAL CO₂ EMISSIONS SAVINGS FROM GLOBAL LED ADOPTION BY 2035

EQUIVALENT TO 200 MILLION CARS

OR 200 NEW COAL FIRED POWER STATIONS

WE SUPPLY

- HPA for LED sapphire substrates
- HPA for LED phosphors
- Al-precursors for LED phosphors

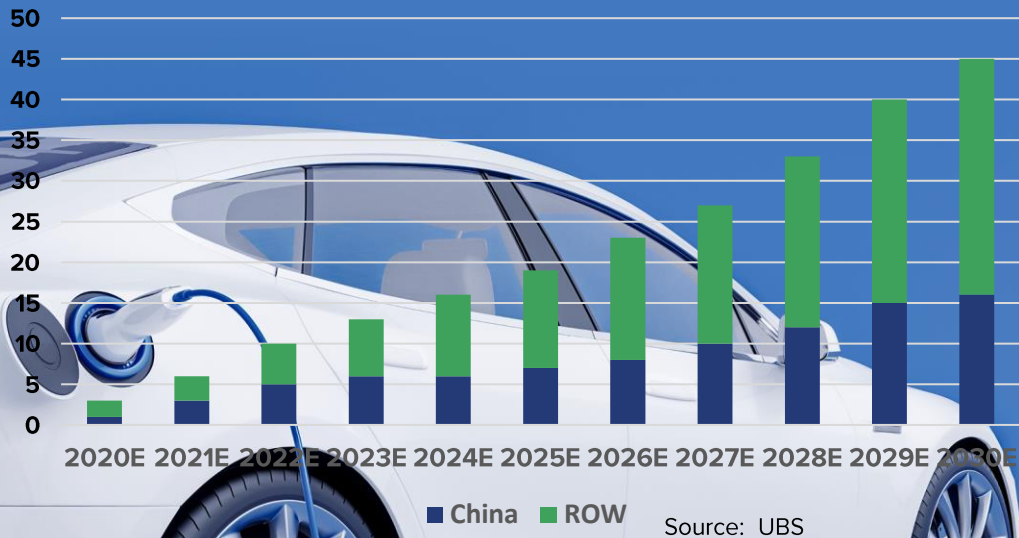
Alpha HPA

Sources: US Dept of Energy, www.microled-info.com & IHS Markits

E-MOBILITY

The next major driver of de-carbonisation

EV Sales Forecast (M units)



Gasoline Only



Average Emissions

380

Grams of CO₂e per mile

Plug-in Hybrid Electric



209

Grams of CO₂e per mile

Battery Electric



154

Grams of CO₂e per mile

Source: Inside EV's (www.insideevs.com)

CO₂ Emissions

50%



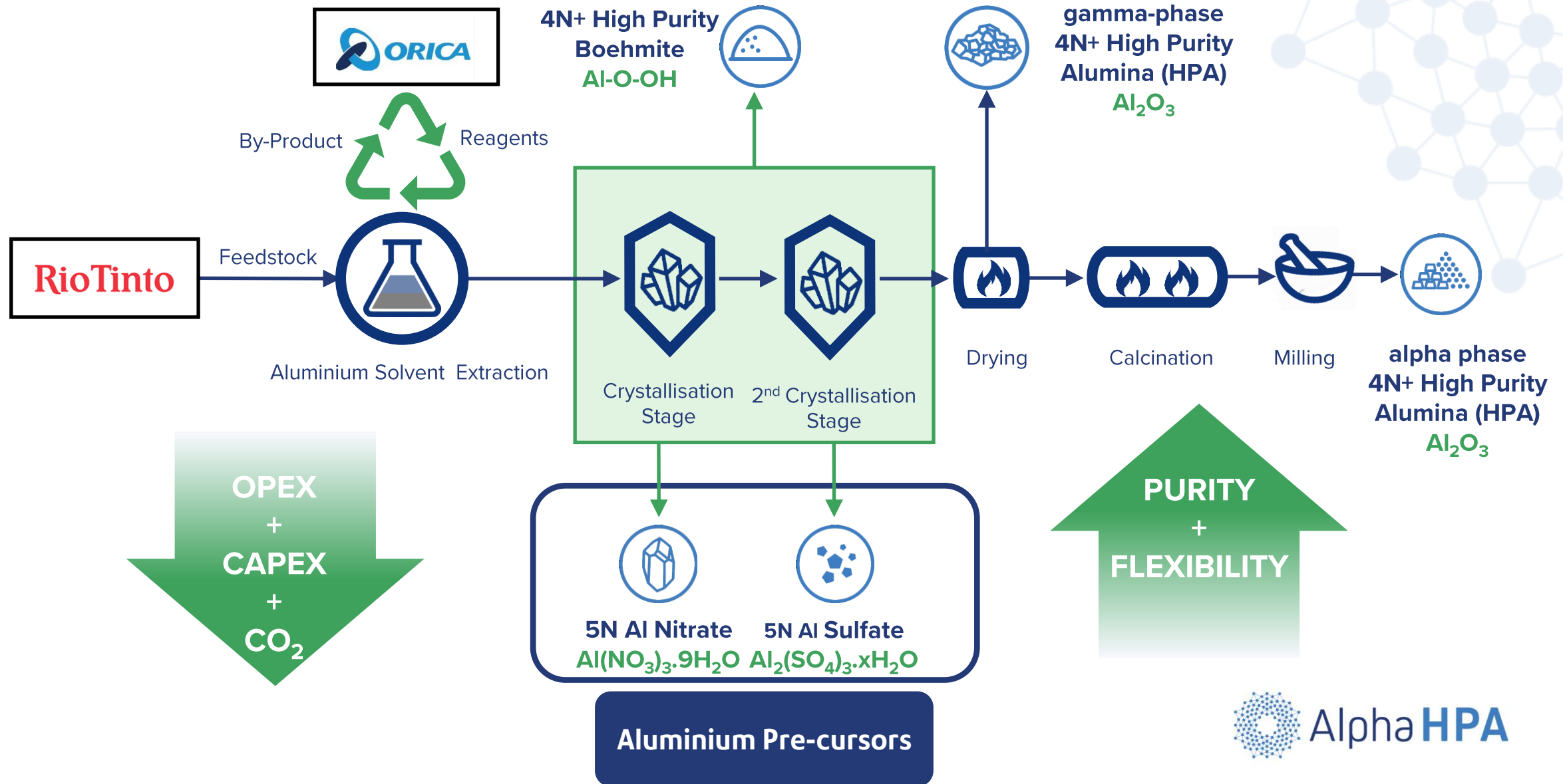
WE SUPPLY

- ✓ HPA for separators
- ✓ Al-precursors for cathode
- ✓ Al-precursors for anode



Alpha HPA

Process Flow Sheet: World First + Disruptive



Our products:

High Purity Aluminas



Ultra High Purity Alumina (HPA) Powder & Tablets

>99.995% (4N5) purity HPA engineered to suit customers specifications such as bespoke particle sized powders, sintered and un-sintered granules and sintered custom ingots.



Ultra High Purity Boehmite

A bespoke engineered >99.995% (4N5) purity Boehmite to suit specific customer requirements, ideal for LiB separator coatings and as a precursor for speciality applications.

Aluminium Pre-cursors



Ultra Aluminium Nitrate

Our >99.999% (5N) purity aluminium nitrate is the purest product available at commercial scale. Key applications in particle coating, LED, aluminate scintillators and other specialty products.



Ultra Aluminium Sulfate

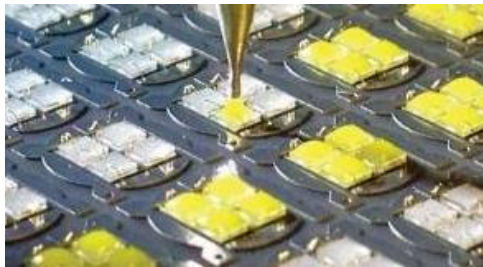
Our >99.999% (5N) aluminium sulfate is the purest product available at commercial scale. A premium product for synthesis of aluminium cathode active materials (CAM) with NCA, NCMA and NFA.

Our products for LED lights

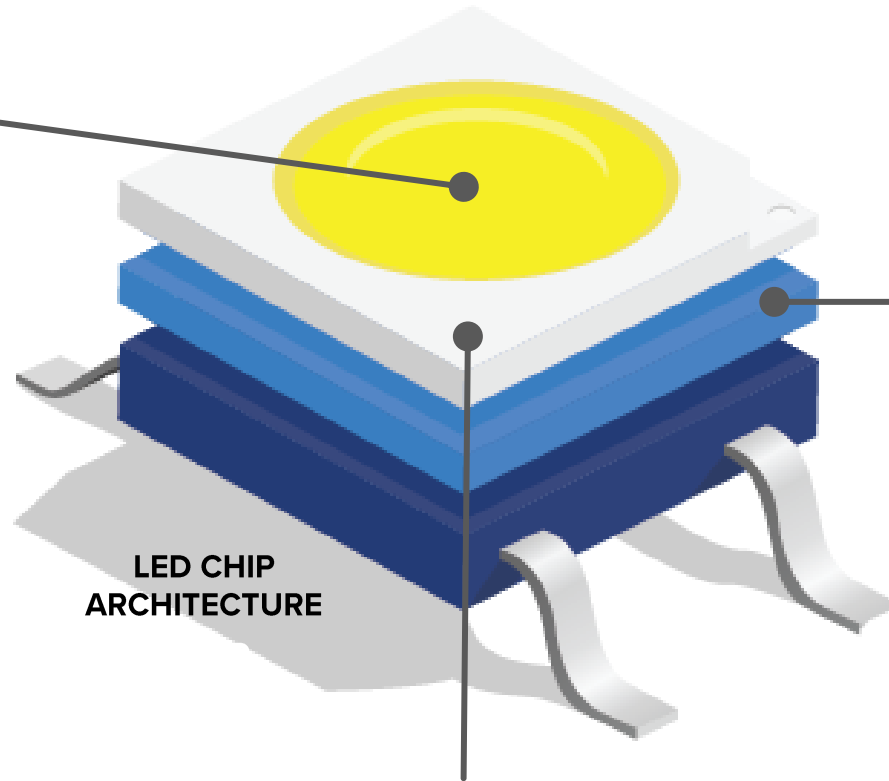
LED PHOSPHORS

Synthesis of Aluminate (YAG) Phosphors for white LEDs

HPA
+
5N Al-Nitrate



Addition of YAG phosphors to LED lighting circuits



SAPPHIRE GLASS WAFERS

Sapphire crystal growth cut to sapphire wafer

HPA Pellets

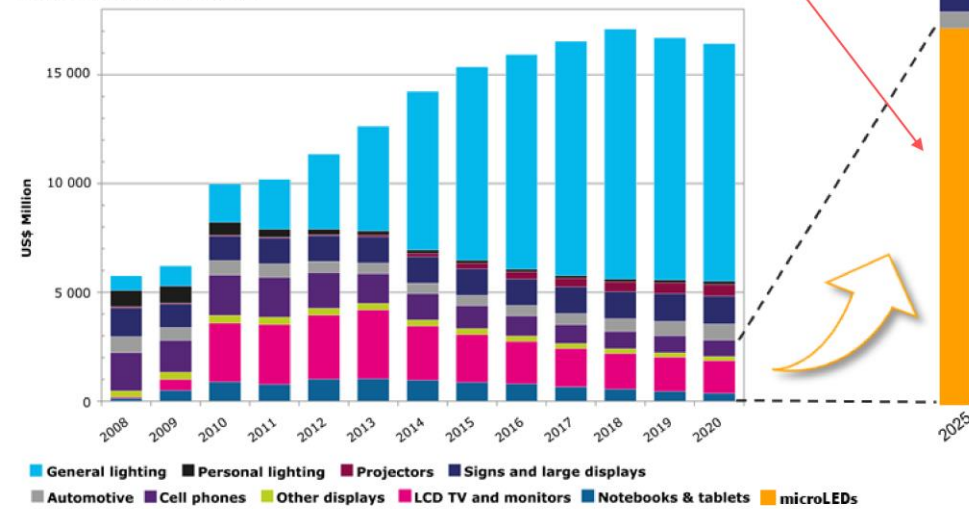
Micro LEDs: The LED market multiplier

- Adoption of micro-LEDs has the potential to double existing LED market
- Micro LEDs require nano-size phosphors
- Nano-size phosphors increasingly require 'wet process' synthesis >> using Al-nitrate

MicroLED Market

MicroLEDs set to double the size of the entire LED market: +17 Billion USD by 2025*

Source: MarketWatch, Inc.



- Apple** LuxVue (Acquired)
- Facebook** mLED, InfiLED, plessey (Acquired)
- Intel** Aledia (Equity Invest.)
- Google** g1o (Equity Invest.)

Sapphire Glass Manufacture:

Major Supply Chain Disruption

- Alpha HPA is qualified for sapphire crystal boule production grown by premium sapphire glass manufacturer and their customers
- Approximately **25-40%** of global sapphire glass production is Russia based
- Alpha HPA now accelerating commercial supply discussions in response



Alpha HPA's sintered pellets



Crucible stacking



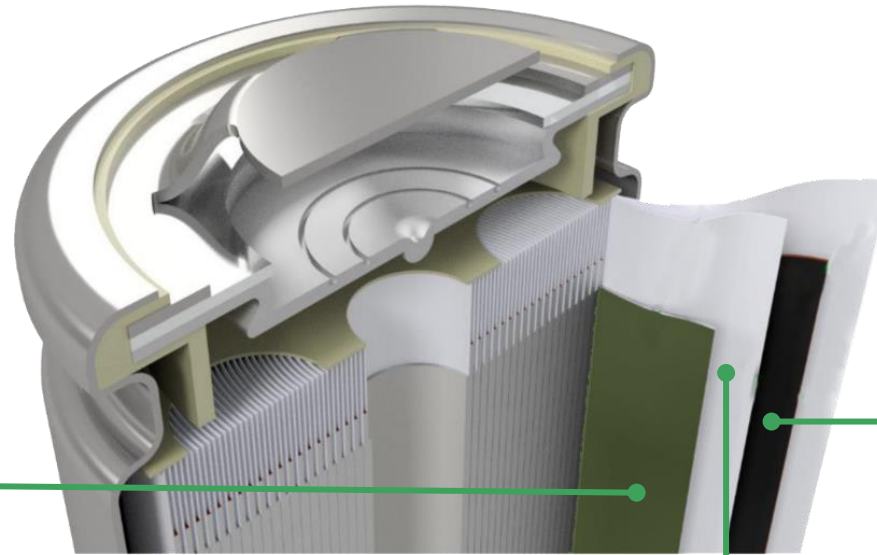
Single crystal boule

Our products for the lithium-ion cell

CATHODE

Cathode pre-cursors for
NCA & NCMA and
alumina coating

5N Al-Nitrate
+
5N Al-Sulfate



ANODE

Pre-cursors for coating
graphite and silicon
anode

5N Al-Nitrate

SEPARATOR

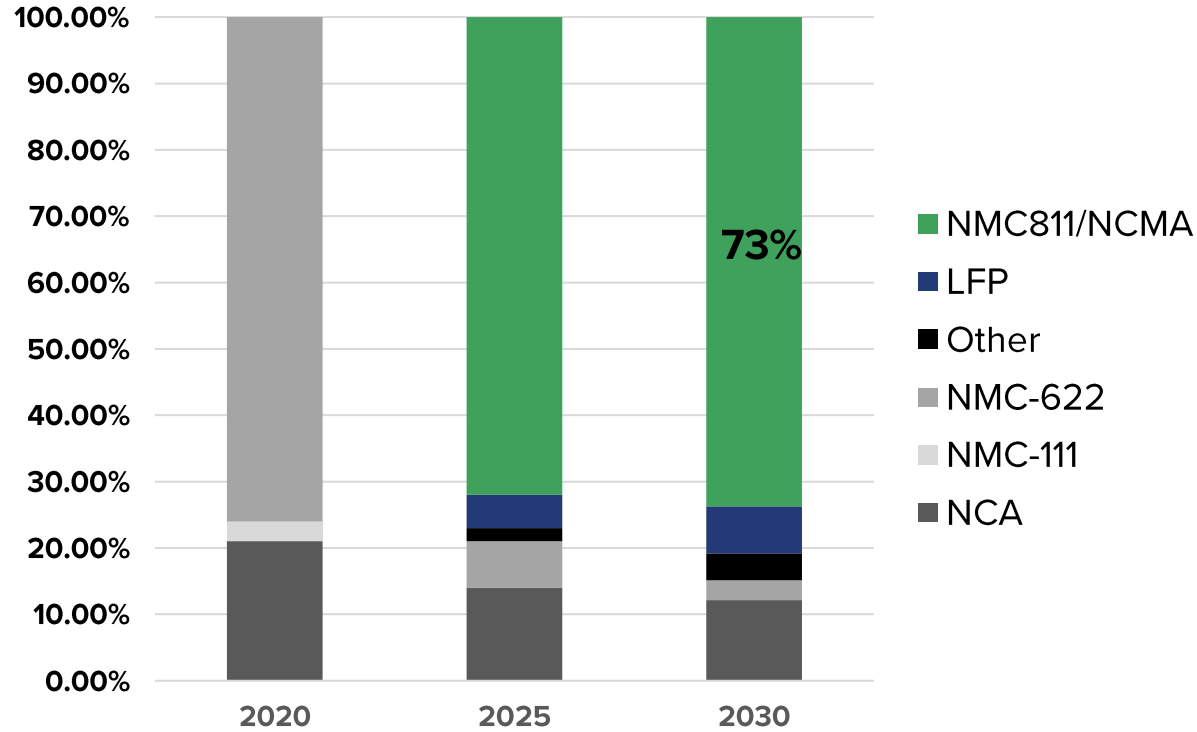
Ceramic coating for
thermal management

HPA
&
**High Purity
Boehmite**



5N Aluminium Precursors: Solving High Nickel Cathodes

The Rise of High Nickel Cathodes

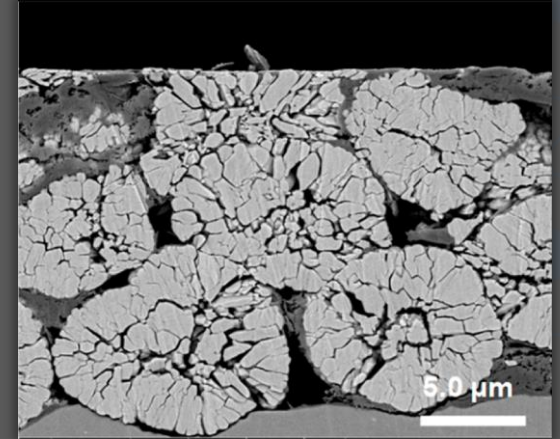


Auto Market (GWh/a)	2020	2025	2030
	53	243	820

Source: UBS – July 2021

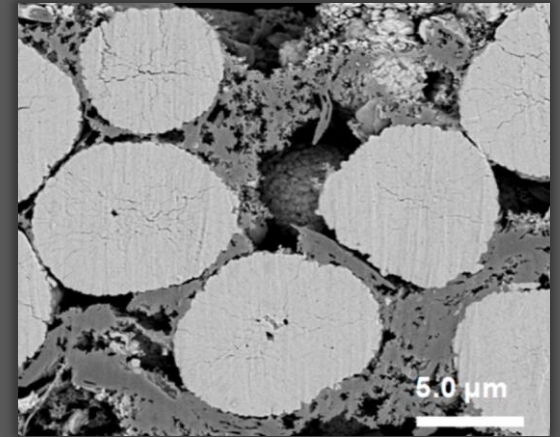
- High nickel cathodes to dominate by 2025
- Cathode instability solved by Alumina coating and/or Al doping eg: NCMA cathode – GM/Ultium

Untreated High Nickel (+80%) Cathode is unstable



Breakdown of high nickel (NCM811) cathodes after 1,000 cycles
Source: Kim et al, ACS Energy 2019

Aluminium doped High Nickel (+80%) Cathode is stable

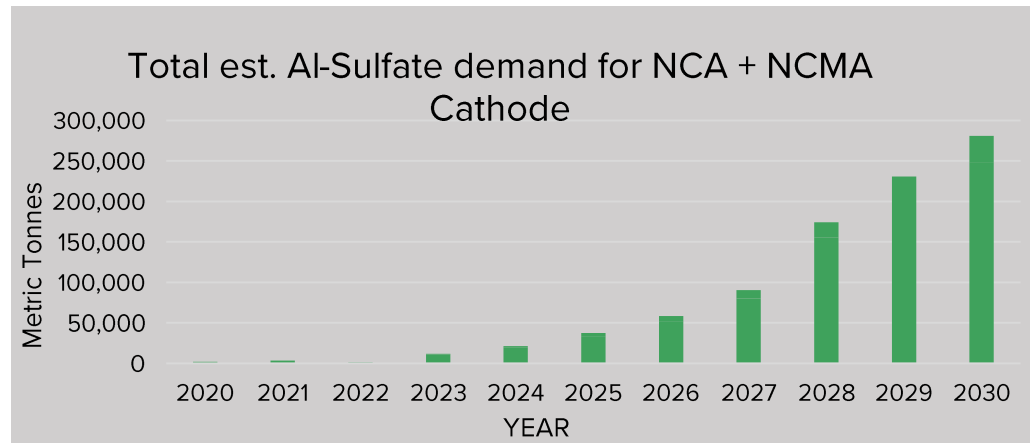
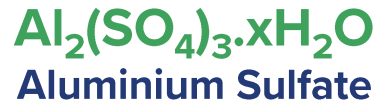


Al doped high nickel (NCMA811) cathodes after 1,000 cycles
Source: Kim et al, ACS Energy 2019

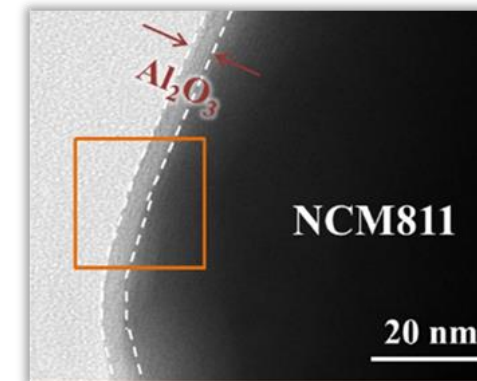
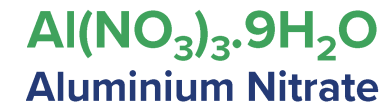
5N Aluminium Precursors: Solving High Nickel Cathodes

- High Nickel Cathodes to dominate by 2025
- Cathode instability solved by Alumina coating and/or Aluminium doping
- **Alpha HPA producing both required precursors at world leading purity**

Aluminium Doping NCA and NCMA using Al-Sulfate



Alumina Coating Using Al-Nitrate to coat Al_2O_3



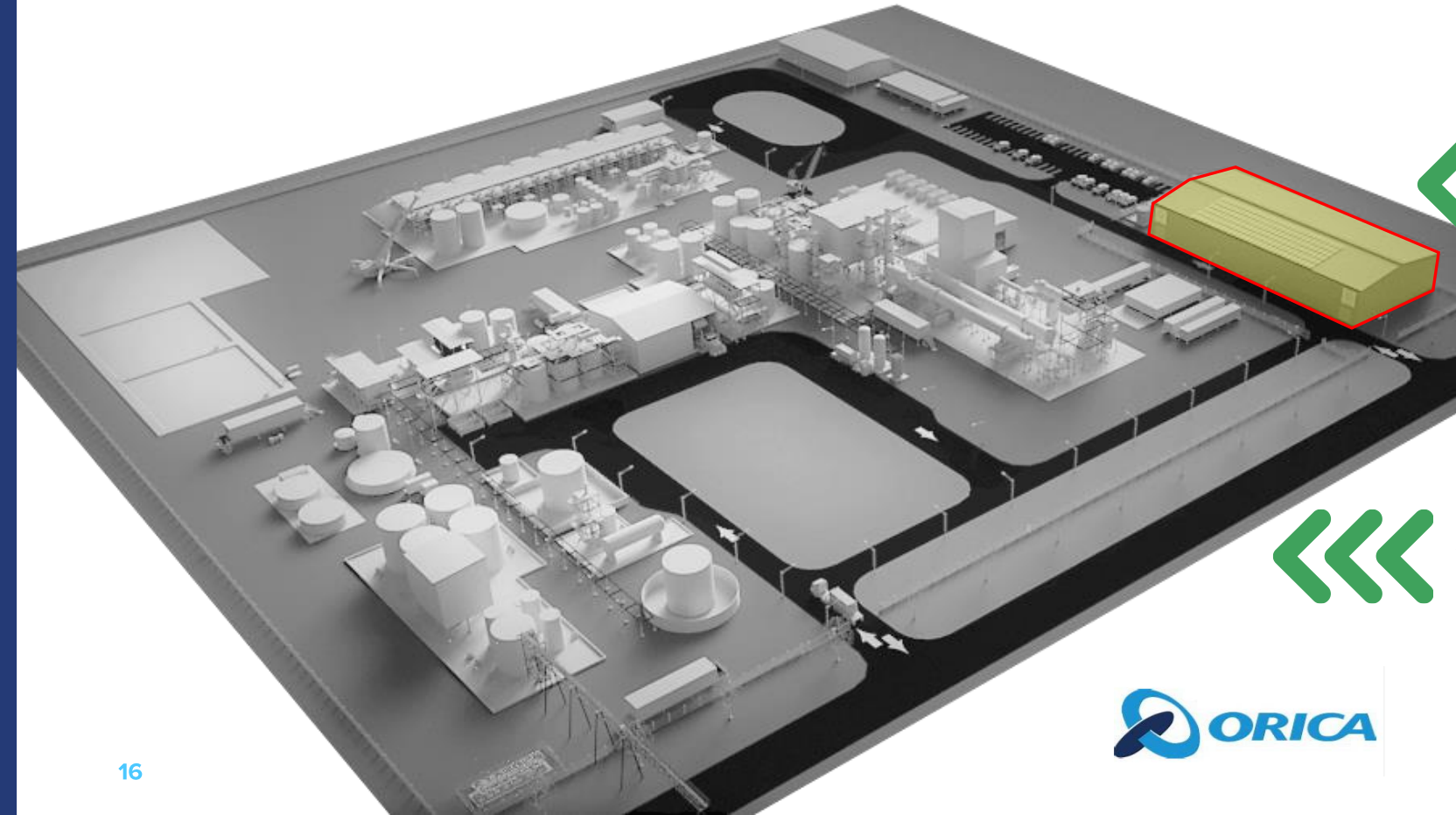
Alumina coated (NCM811)
cathodes

Project Layout:

Stage 1: Under Construction

Stage 2: Full Scale Facility

- Stage 1 under construction within the HPA First Project Footprint
- Stage 1 to be incorporated into the full scale HPA First Plant as a dedicated unit for 5N Al-Sulfate.
- alphahpa.com.au/our-projects



\$35M Stage 1 - Under Construction
Additional \$15.5M Aust Govt Grant



Stage 2 – Full-scale facility on same site
\$45M Aust Govt Grant



Stage 1:

- **Stage 1 fully funded - construction underway**
- Stage 1 fast-tracking production of 5N Al-precursors at ~350 tpa
- To be constructed within Alpha's existing HPA First Project site at Gladstone
- Targeting September 2022 commissioning
- **April 2022** - \$15.5M grant awarded to expand Stage 1 and add additional products
 - Up to 400tpa Al-precursors
 - Up to 15tpa HPA
 - Up to 15tpa boehmites



Live Construction Updates:
<http://167.172.94.158/cameras/camera2/camera.html>



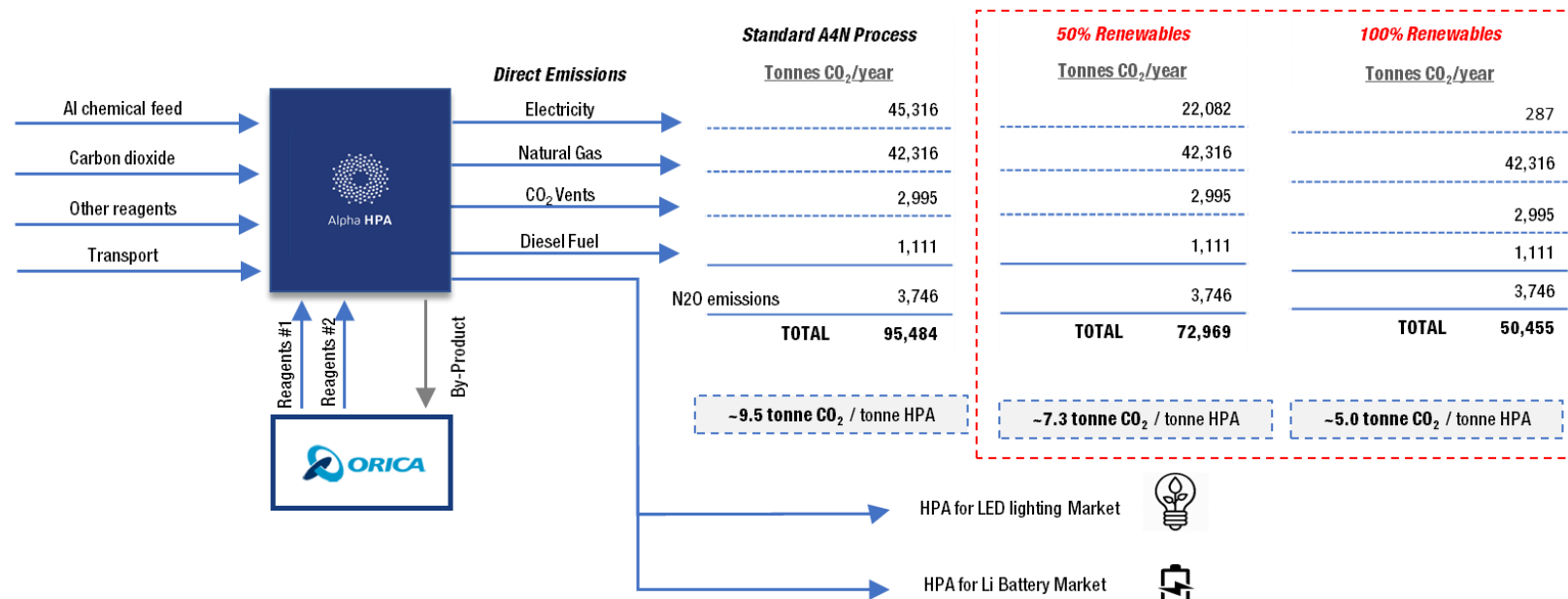
Stage 1: Under Construction – Fully Funded



HPA First Project: Low Carbon Footprint

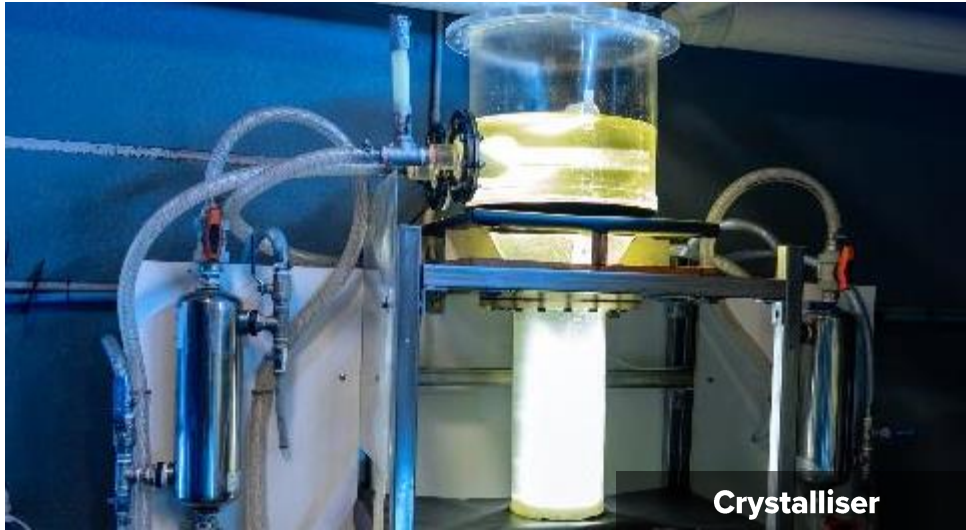
- Alpha HPA has a MOU with CleanCo (QLD) for up to 100% renewable energy supply
- 100% renewable energy supply represents a 59% reduction in CO₂ emissions vs the incumbent (alkoxide) HPA process

Item	Tonnes CO ₂ per tonne HPA	CO ₂ Reduction
Incumbent alkoxide process	12.44	
HPA First Project - process baseline	9.5	22.4%
HPA First Project - 50% renewable electricity purchase	7.3	41%
HPA First Project - 100% renewable electricity purchase	5.04	59%



**Incumbent HPA production process (bauxite>refinery>smelter>alkoxide>HPA) estimated to have a 776J per tonne HPA energy profile = 12.3 tonnes CO₂ per tonne HPA

HPA First Project: Brisbane Plant >>>



Crystalliser



Pre-Cursor Room



Pelleting Room



Solvent Extraction

- Continuously operating facility, with over 7,000 operating hours
- Aluminium nitrate production to date >5,100kg
- Servicing specialty sales and continued product test orders

HPA First Project: Global Product Marketing

- Global marketing network established
- >100 product samples now distributed globally to >40 end users
- Products qualified for sapphire glass, LED phosphors and separator coatings
- Al-nitrate and HPA sales commenced
- **June 2022:**
 - Multiple (16) bids submitted for high value supply contracts
 - A further 33 separate end users testing/qualifying multiple products



HPA First Project: Status and Catalysts



Mar '20 Definitive Feasibility Study – **ROBUST PROJECT CONFIRMED**

Sept '20: 2 x High-purity Li-B Pre-Cursor manufacture confirmed

Feb '21: Major Project Permitting Approval (MCU)

Feb '21: HPA Pellets qualifies for sapphire glass manufacture

Apr '21: MOU with Saint Gobain – all products

May '21: HPA powder qualifies for LED phosphor manufacture

May '21: MOU with CleanCo QLD to provide up to 100% Renewable Energy

Aug '21: Orica Definitive Agreements

Sep '21: NAIF – Strategic Assessment Phase Approval

Nov '21: Project Site Secured – **PPF CONSTRUCTION COMMENCED**

Mar '22: Award of \$45M Federal Government Grant for Stage 2

Apr '22: Award of \$15.5M Federal Government Grant for Stage 1

Current: Global Outreach >100 end-user test products shipped, 14 supply bids submitted.

Pending: Large Volume Product Offtakes

Pending: Final Product Mix and DFS Update

Pending: Project Financing and FID

Sept '22: COMMISSIONING – STAGE 1



Corporate Snapshot

TRADING INFORMATION

ASX CODE	A4N
Share Price (06/06/2022)	~52c
52-week trading range	40c – 70c
Issued Shares	795.5M

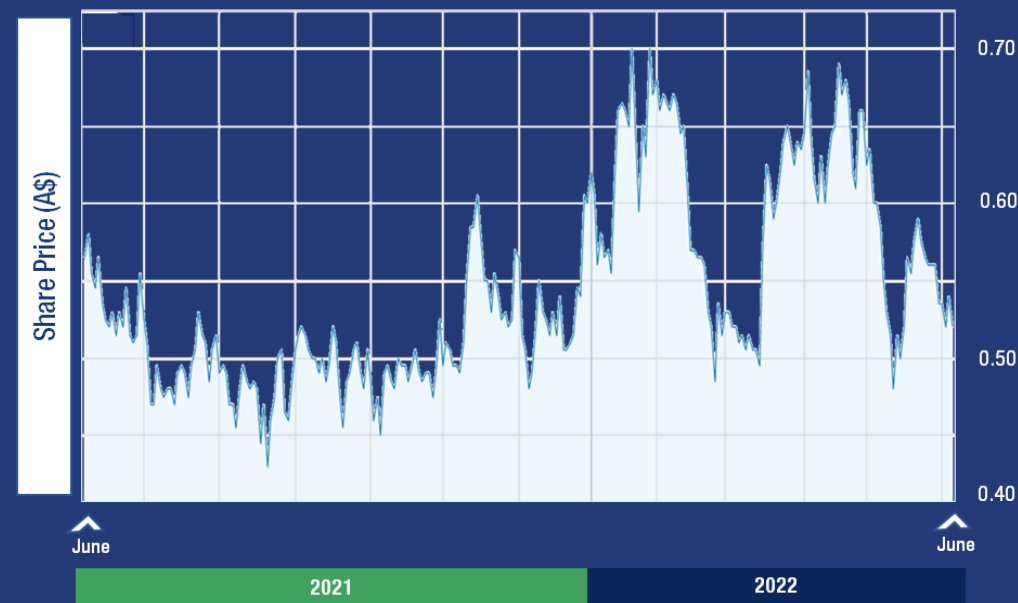
CAPITAL STRUCTURE

Issued Shares	795.5M
Unlisted options (@20c)*	10.0M (expire 31 July 2022)
Unlisted options (@30c)	31.6M (expire 31 July 2022)
Unlisted options (@35c)*	5.0M (expire 30 Sept 2023)
Unlisted options (@35c)	26.0M (expire 31 July 2023)
Unlisted options (@90c)	12.0M (expire 30 April 2025)

Market Cap	\$414M
Est Cash (31-05-2022)	~\$20M – No Debt
Enterprise Value	\$394M

* Licensor Options

SHARE PRICE PERFORMANCE – 12 MONTHS



SHAREHOLDERS

TOP 20

	55%
Regal Funds	7.46%
Permgold P/L (N. Seckold)	8.5%



THANK YOU



Alpha HPA

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