

13

Al

Aluminium  
26.982

# ULTRA PURE –LOW CARBON ALUMINIUM MATERIALS SUPPLYING DE-CARBONISATION AS CRITICAL MATERIAL SUPPLY CHAINS DIVERSIFY



ASX: A4N

# Alpha HPA: Introduction

We are a technology/industrial chemical company

We make **ultra-high purity aluminium products** with a worlds first process 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 in 2 Stages as the  
**HPA FIRST PROJECT**

**STAGE 1 – IN PRODUCTION**  
**EXPANDING WITH A\$15.5M AUST GOVT GRANT**

**STAGE 2 – MOVING TO F.I.D**  
**A\$45M IN AUST GOVT GRANTS APPROVED**

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



## Cautionary Statement

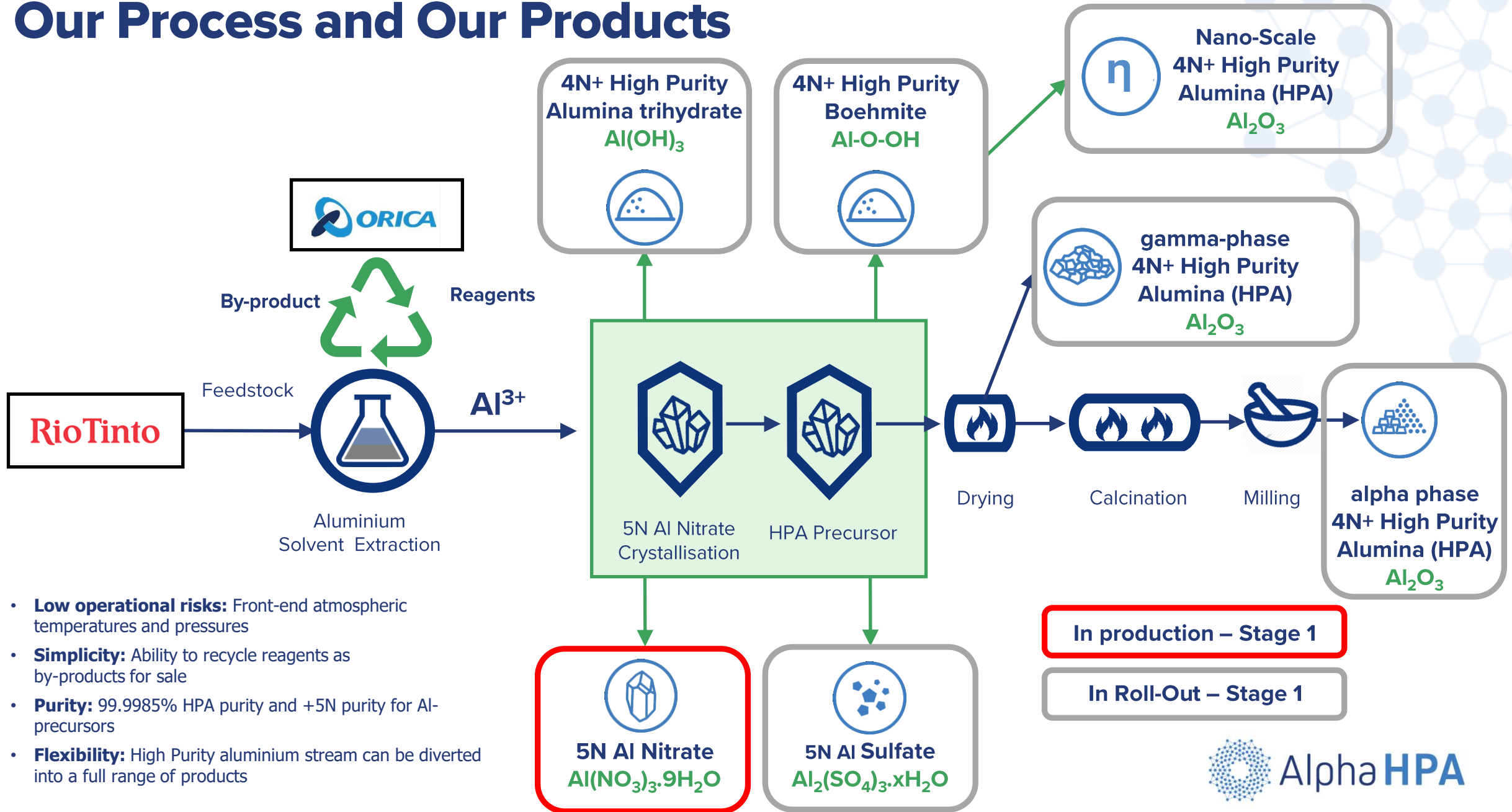
The Definitive Feasibility Study (DFS) referred to in this presentation has been undertaken to assess the technical and financial viability of the HPA First project. The DFS is based on the material assumptions about the availability of funding and the pricing received for HPA. While the Company considers 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.

## Forward Looking Statements

This presentation contains certain forward-looking statements with respect to the financial condition, results of operations, and business of the Company and certain plans and objectives of the management of the Company. These forward-looking statements involve known and unknown risks, uncertainties and other factors which are subject to change without notice and may involve significant elements of subjective judgement and assumptions as to future events which may or may not occur. Forward-looking statements are provided as a general guide only and there can be no assurance that actual outcomes will not differ materially from these statements. Neither the Company, nor any other person, give any representation, warranty, assurance or guarantee that the occurrence of the events expressed or implied in any forward-looking statement will actually occur. In particular, those forward-looking statements are subject to significant uncertainties and contingencies, many of which are outside the control of the Company. A number of important factors could cause actual results or performance to differ materially from the forward looking statements. Investors should consider the forward looking statements contained in this DFS in light of those disclosures.

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# Our Process and Our Products



- **Low operational risks:** Front-end atmospheric temperatures and pressures
- **Simplicity:** Ability to recycle reagents as by-products for sale
- **Purity:** 99.9985% HPA purity and +5N purity for Al-precursors
- **Flexibility:** High Purity aluminium stream can be diverted into a full range of products

# Our product offering: High Technology Sector Coverage

## High Purity Aluminium Salts



$\text{Al}_2(\text{SO}_4)_3 \cdot 16\text{H}_2\text{O}$   
Ultra Aluminium Sulfate



$\text{Al}(\text{NO}_3)_3 \cdot 9\text{H}_2\text{O}$   
Ultra Aluminium Nitrate



$\text{Al}_2\text{O}_3$   
Ultra High Purity Alumina  
Powder & Tablets



$\text{Al-O-OH}$   
Ultra Boehmite



$\text{Al}(\text{OH})_3$   
Alumina Tri-Hydrate

## LITHIUM-ION BATTERY APPLICATIONS

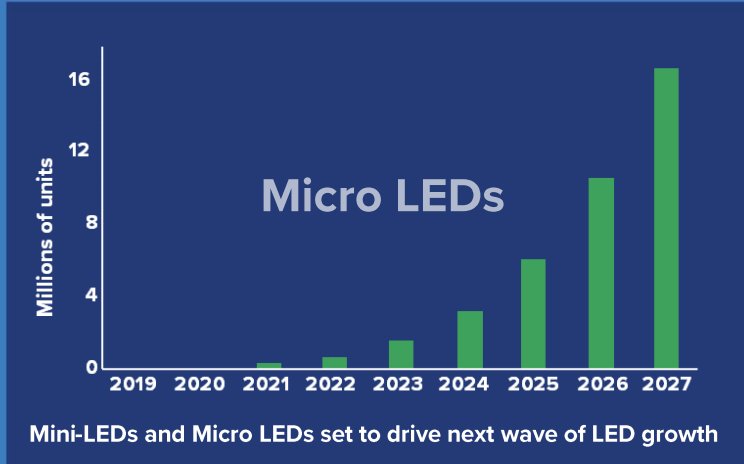
### LED LIGHTING

### SEMI-CONDUCTOR CMP POLISHING



# LED-LIGHTING

## The current technology driver of de-carbonisation



LEDs reduced CO<sub>2</sub>e 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 CO<sub>2</sub> 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 CO<sub>2</sub> EMISSIONS**

ANNUAL CO<sub>2</sub> 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

# Our products in LED lighting

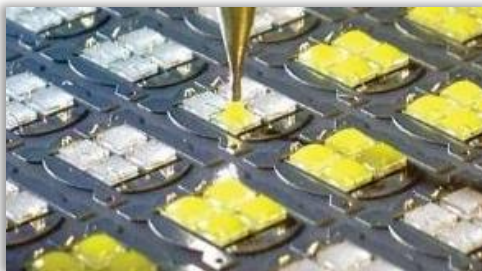
## LED PHOSPHORS

Synthesis of Aluminate (YAG) Phosphors for white LEDs

HPA

+

5N Al-Nitrate



Addition of YAG phosphors to LED lighting circuits

**ALPHA HPA QUALIFIED WITH 2 EU BASED LED PHOSPHOR OEM'S  
1<sup>st</sup> SALES COMPLETE  
LOI WITH LITEC-LLL**

## SAPPHIRE GLASS WAFERS

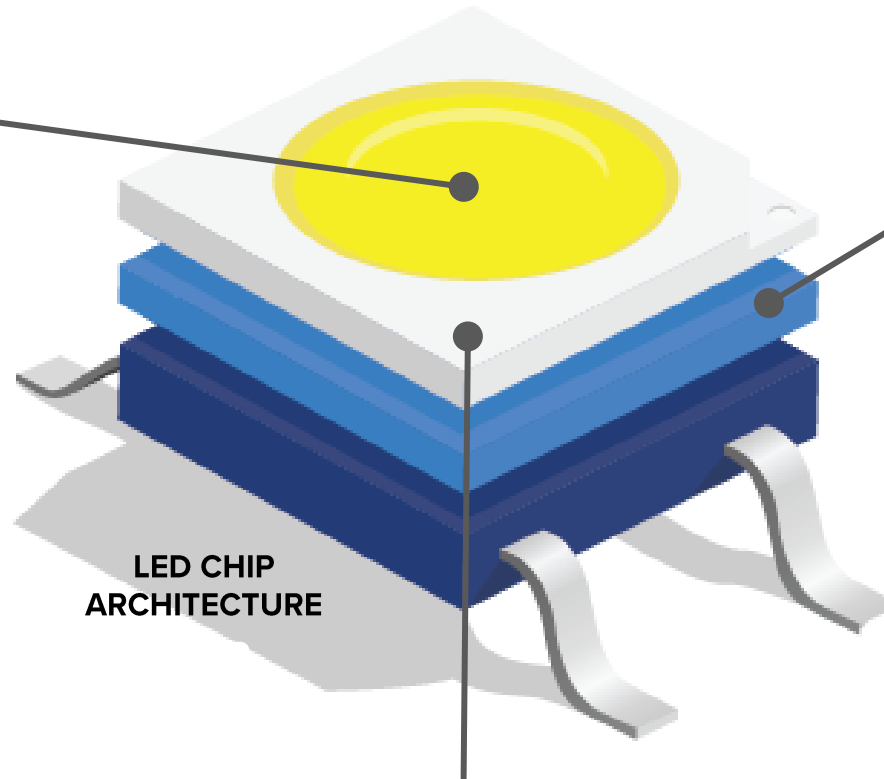
Sapphire crystal growth cut to sapphire wafer

**HPA Pellets**



Addition of YAG phosphors to LED lighting circuits

**ALPHA HPA QUALIFIED WITH US BASED SAPPHIRE GROWER**



LED CHIP ARCHITECTURE

Ga-N circuit & Al-N Active Layers

**ALPHA HPA QUALIFIED WITH JAPAN BASED AL-N MANUFACTURER**



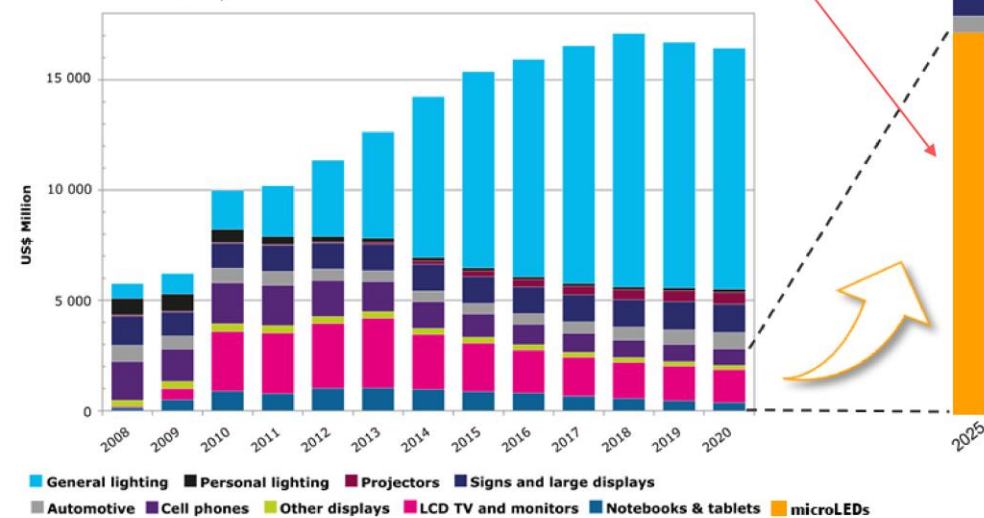
# Micro LEDs: The LED market multiplier

- Market analysts have forecast the adoption of micro-LEDs
- The recent confirmation that Apple is now making the move is considered highly significant, with the potential to double existing LED market

## MicroLED Market

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

Source: MarketWatch, Inc.



**LuxVue**  
(Acquired)

**mLED**  
**InfiniLED**  
Next Generation Display Technology  
 **plessey**  
(Acquired)

**Capital** (Equity Invest.)

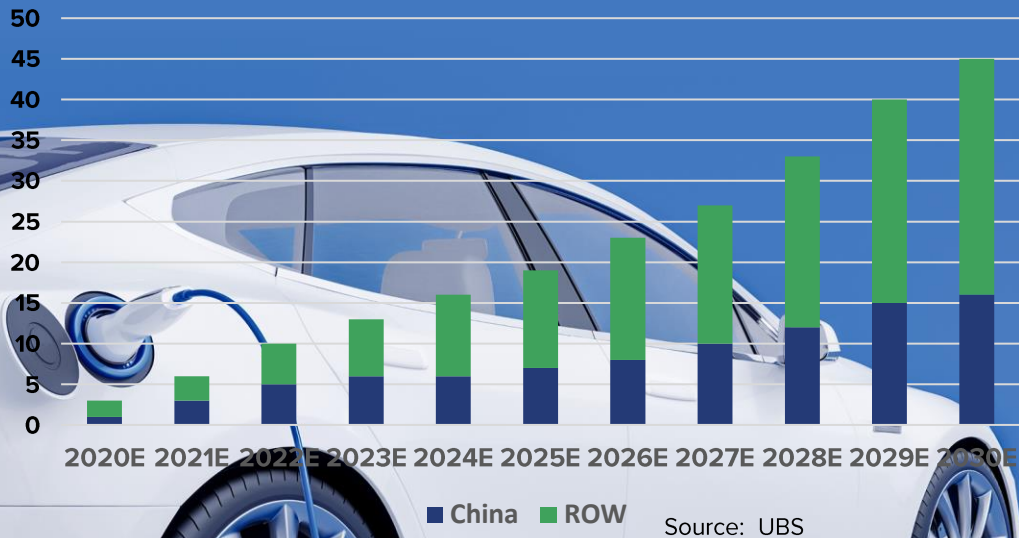
(Equity Invest.)



# E-MOBILITY

## The next major driver of de-carbonisation

EV Sales Forecast (M units)



Gasoline Only



Average Emissions

**380**

Grams of CO<sub>2</sub>e per mile

Plug-in Hybrid Electric



**209**

Grams of CO<sub>2</sub>e per mile

Battery Electric



**154**

Grams of CO<sub>2</sub>e per mile

Source: Inside EV's ([www.insideevs.com](http://www.insideevs.com))

## CO<sub>2</sub> Emissions

50%



WE SUPPLY

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



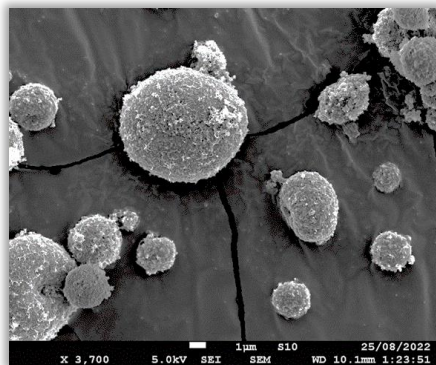
Alpha HPA

# Our products in the lithium-ion cell

## CATHODE

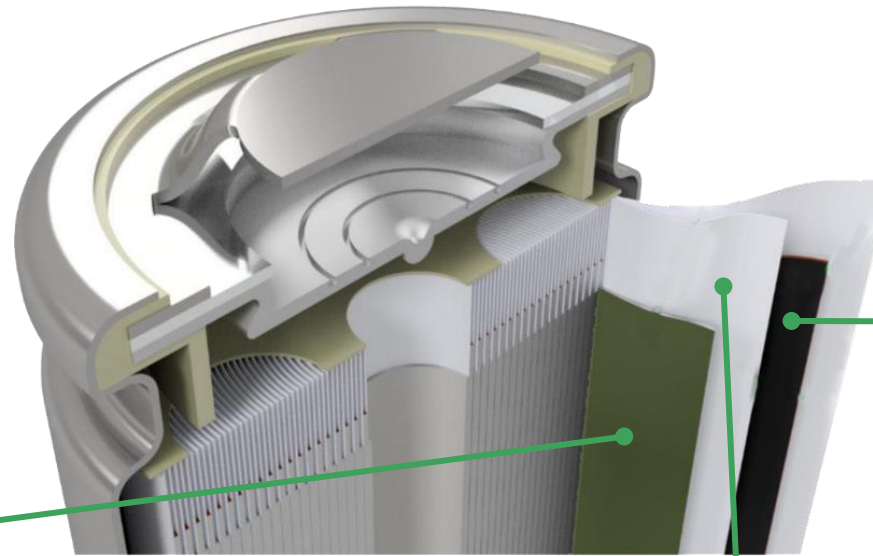
Cathode pre-cursors for NCA & NCMA and alumina coating

**5N Al-Nitrate**  
+  
**5N Al-Sulfate**



Boehmite coated cathode particles from Alpha's Al-Nitrates

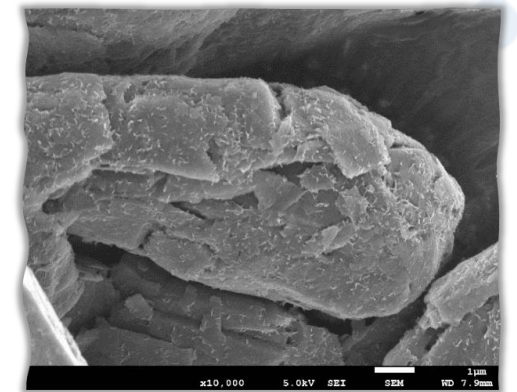
**ALPHA HPA IN FINAL PHASE QUALIFICATION WITH 3 x GLOBAL CATHODE OEM's**



## ANODE

Pre-cursors for coating graphite and silicon anode

**5N Al-Nitrate**



Boehmite coated anode particles from Alpha's Al-Nitrates

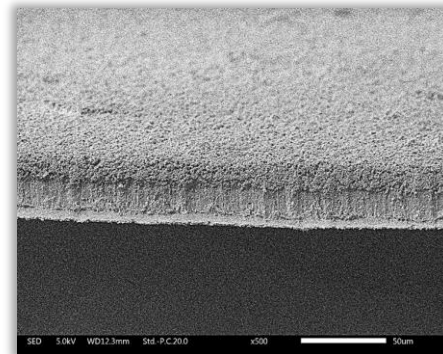
**ALPHA HPA IN TEST WORK PHASE WITH 8 x ANODE OEM's AND DEVELOPERS**



## SEPARATOR

Ceramic coating for thermal management

**HPA & High Purity Boehmite**

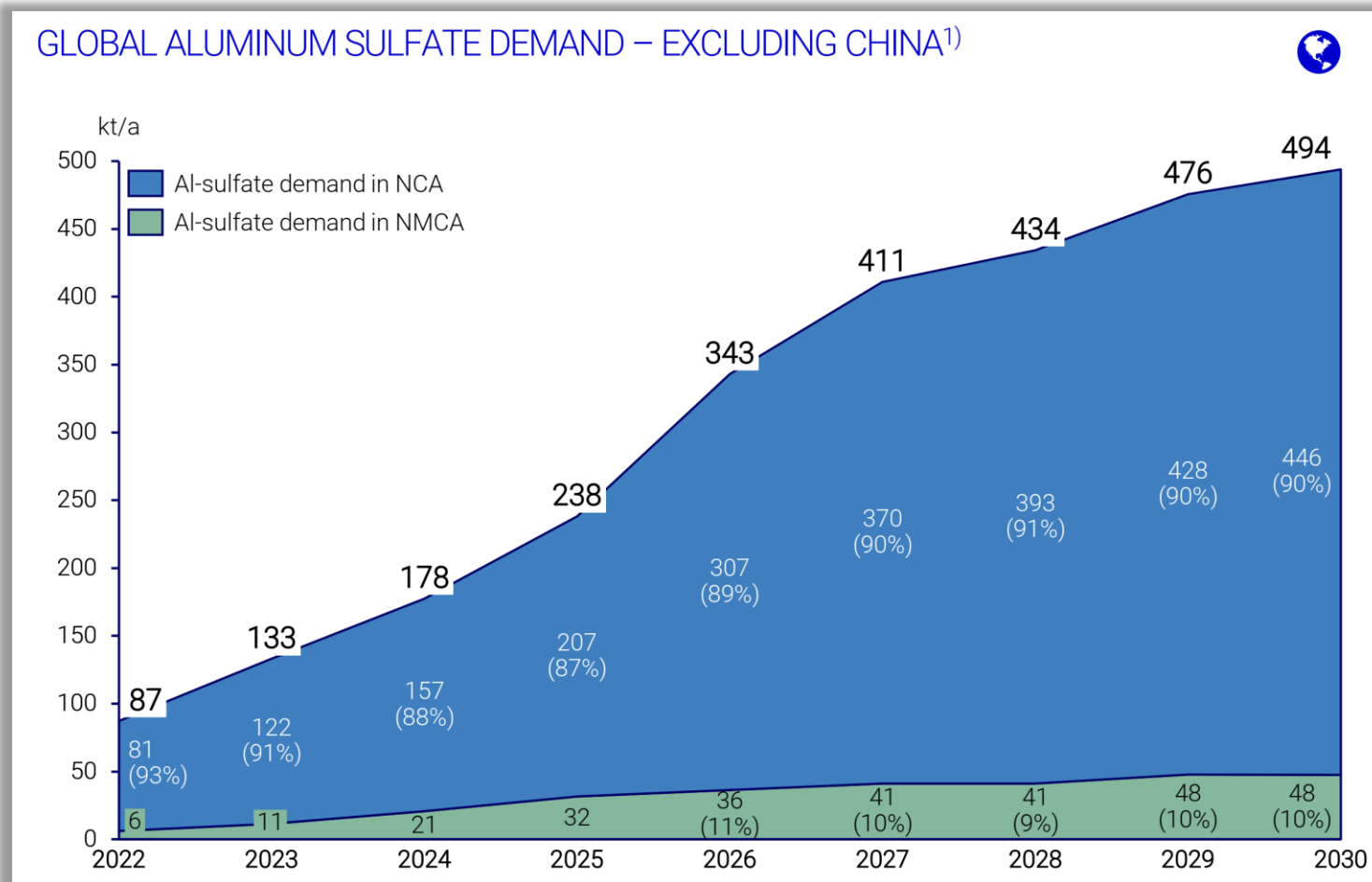


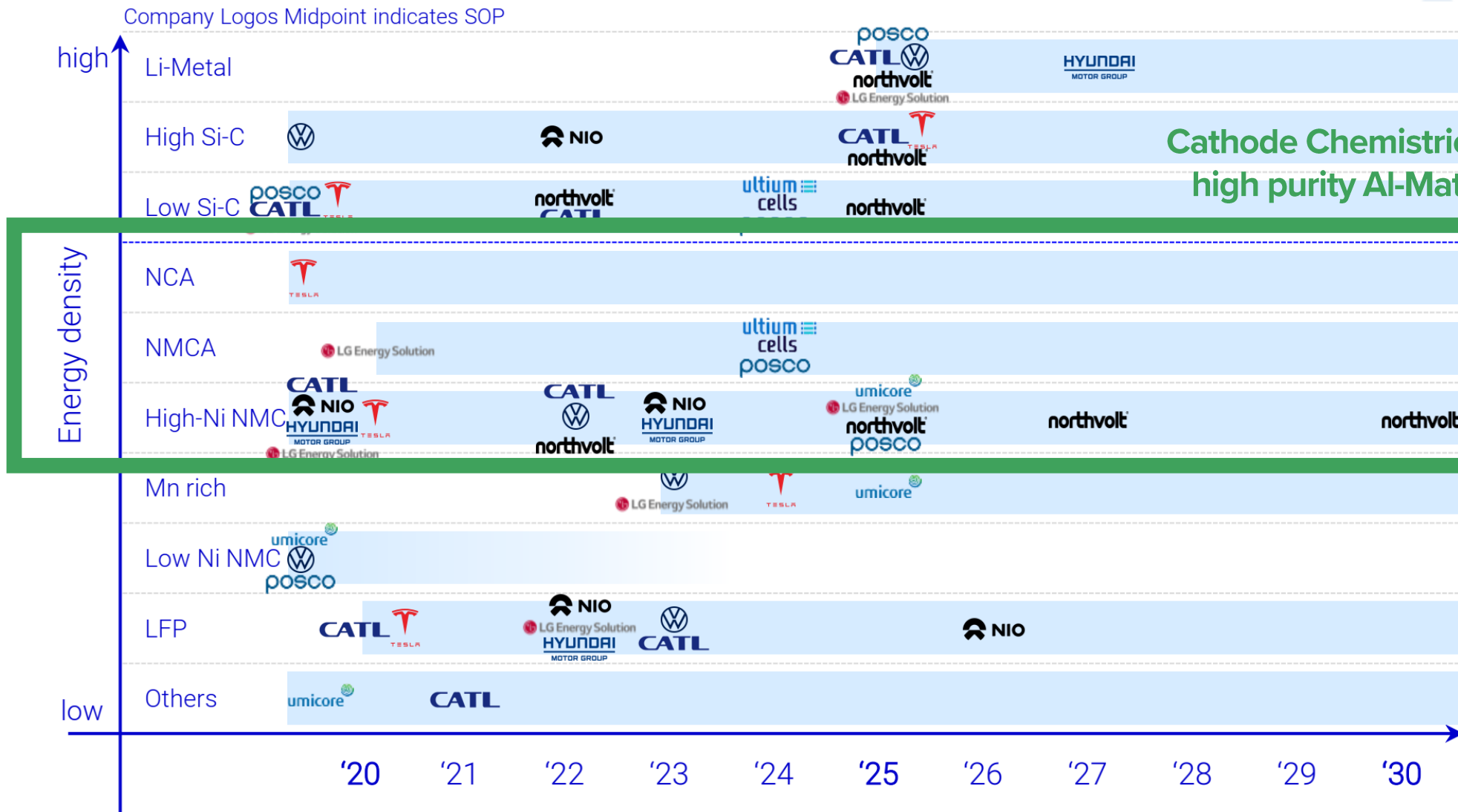
Alpha's HPA coating Li-B separator separator (courtesy FBICRC)

**ALPHA HPA QUALIFIED WITH LEADING GLOBAL SEPARATOR OEM**

# AI-Precursor Demand: The AI-Sulphate example

- Research by the highly regarded P3 Group (commissioned by Alpha)
- ex-China demand growth for AI-Sulphate from 87kt in 2022 to 494kt pa by 2030
- Used in both NCA and NCMA cathode
- Alpha in qualification with 2 x cathode OEM's





Cathode Chemistries with high purity Al-Materials

High Si-C: Si content  $\geq 20\%$   
 Low Si-C: Si content  $< 20\%$   
 High-Ni NMC: Ni content  $\geq 80\%$   
 Low-Ni NMC: Ni content  $< 80\%$

9/23/2022

Alpha HPA | Market Entry Approach Al-Salts

<sup>1)</sup>SoF

# Li-B Sector: Cathode applications



# SEMI-CONDUCTORS

## Global Supply Chains Re-Shoring/Friend-Shoring



**CHEMICAL MECHANICAL POLISHING (CMP) IS A KEY STEP IN SEMI-CONDUCTOR WAFER PREPARATION**

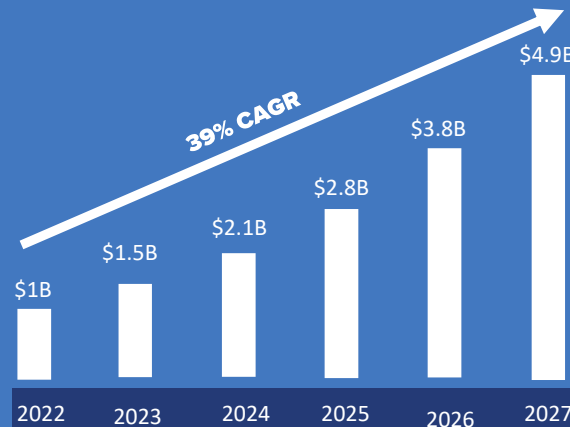
**CMP IS AN ESTIMATED 7% OF THE TOTAL FRONT END SEMI-CONDUCTOR SECTOR BY VALUE\***

THE USA  
**CHIPS ACT**  
WILL INJECT

**USD\$130B** in

the next **5** years to re-shore US capability

Value of SiC Semiconductors in EV's (US\$M)



Source: Wolfspeed

**WE SUPPLY**

- ✓ Boehmites for CMP slurry
- ✓ Al-Nitrates for CMP slurry
- ✓ Nano HPA for CMP slurry (for SiC chips)



Alpha HPA

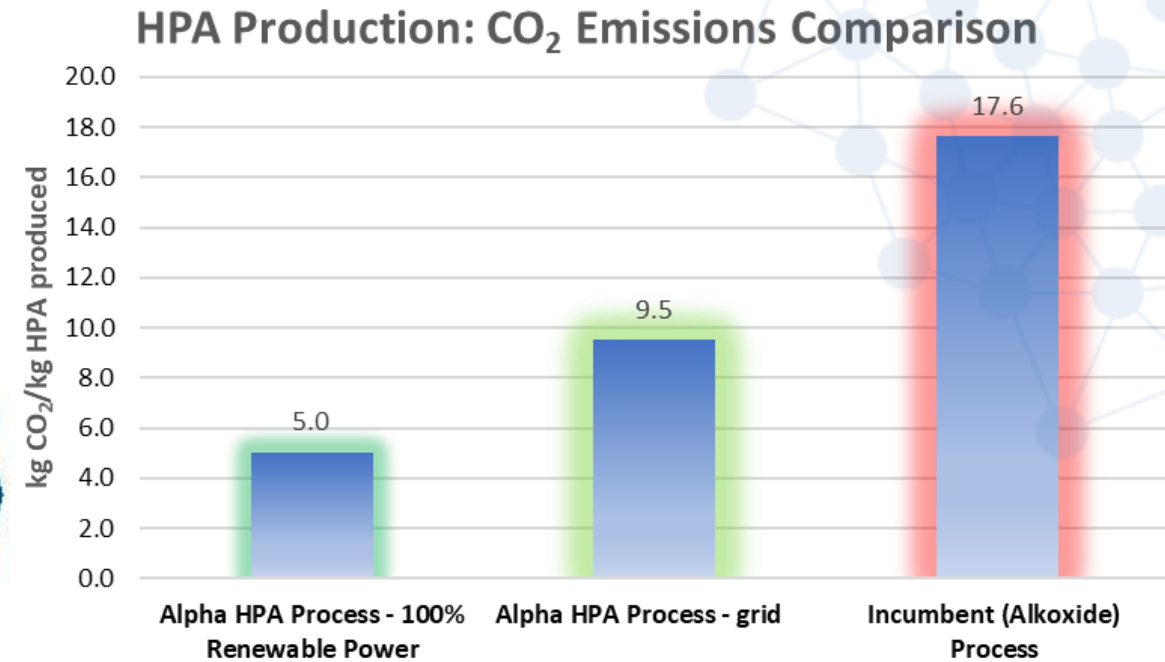
# CO<sub>2</sub> Emissions Summary

~70% lower total emissions in feedstock and production process combined compared to the incumbent process

## EMISSIONS REDUCTIONS

1. We do not use Al metal as feedstock
2. We recycle our reagents
3. We use 100% renewable energy

~70% lower total CO<sub>2</sub> emissions



Pathway to zero emissions via future adoption of H<sub>2</sub> drying and calcination



**Stage 1 : In Production >> Nov 2022**



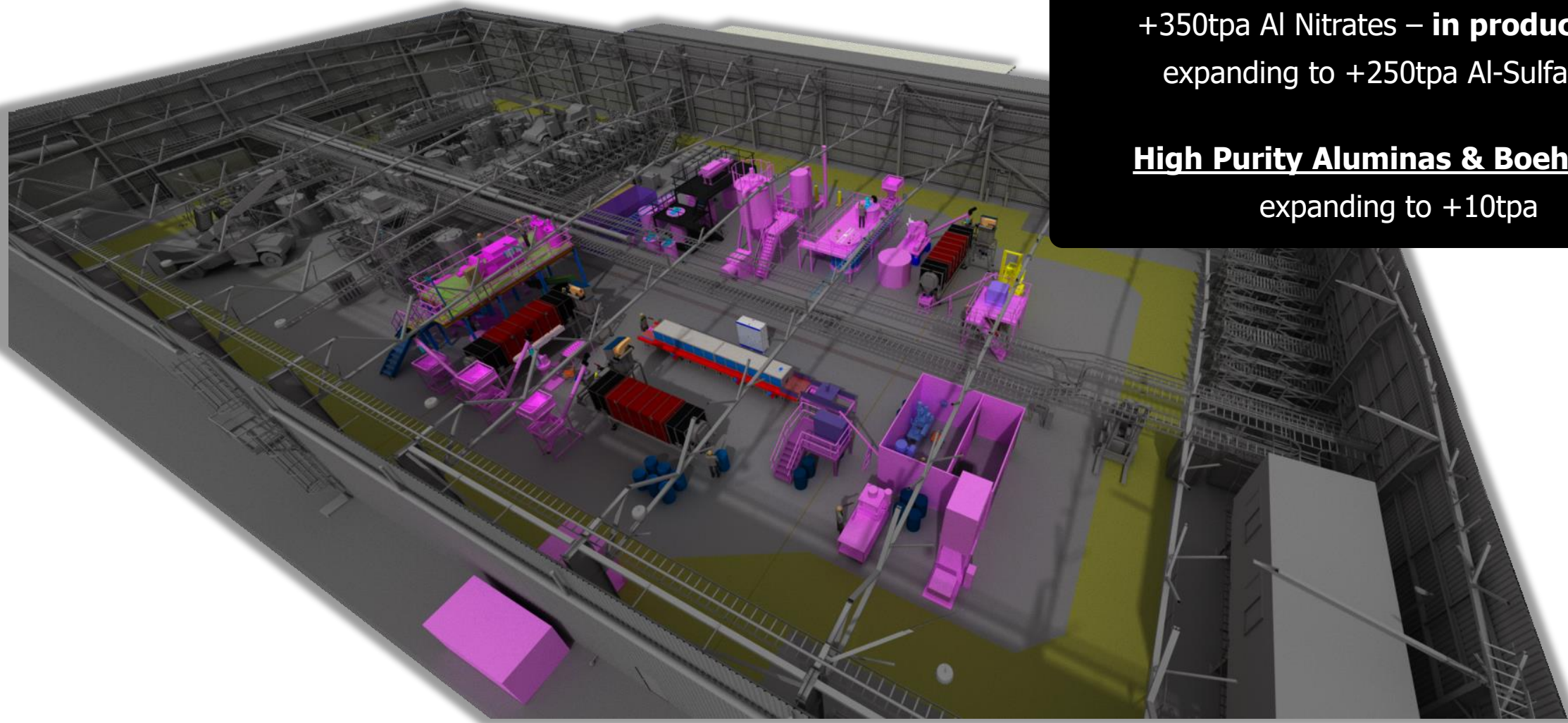


**Stage 1 : In Production >> Nov 2022**





- Expansion fully funded by \$15.5M Aust Critical Minerals Grant
- Orders already placed for long lead process equipment



### Al-Nitrates & Al-Sulfates

+350tpa Al Nitrates – **in production**  
expanding to +250tpa Al-Sulfates

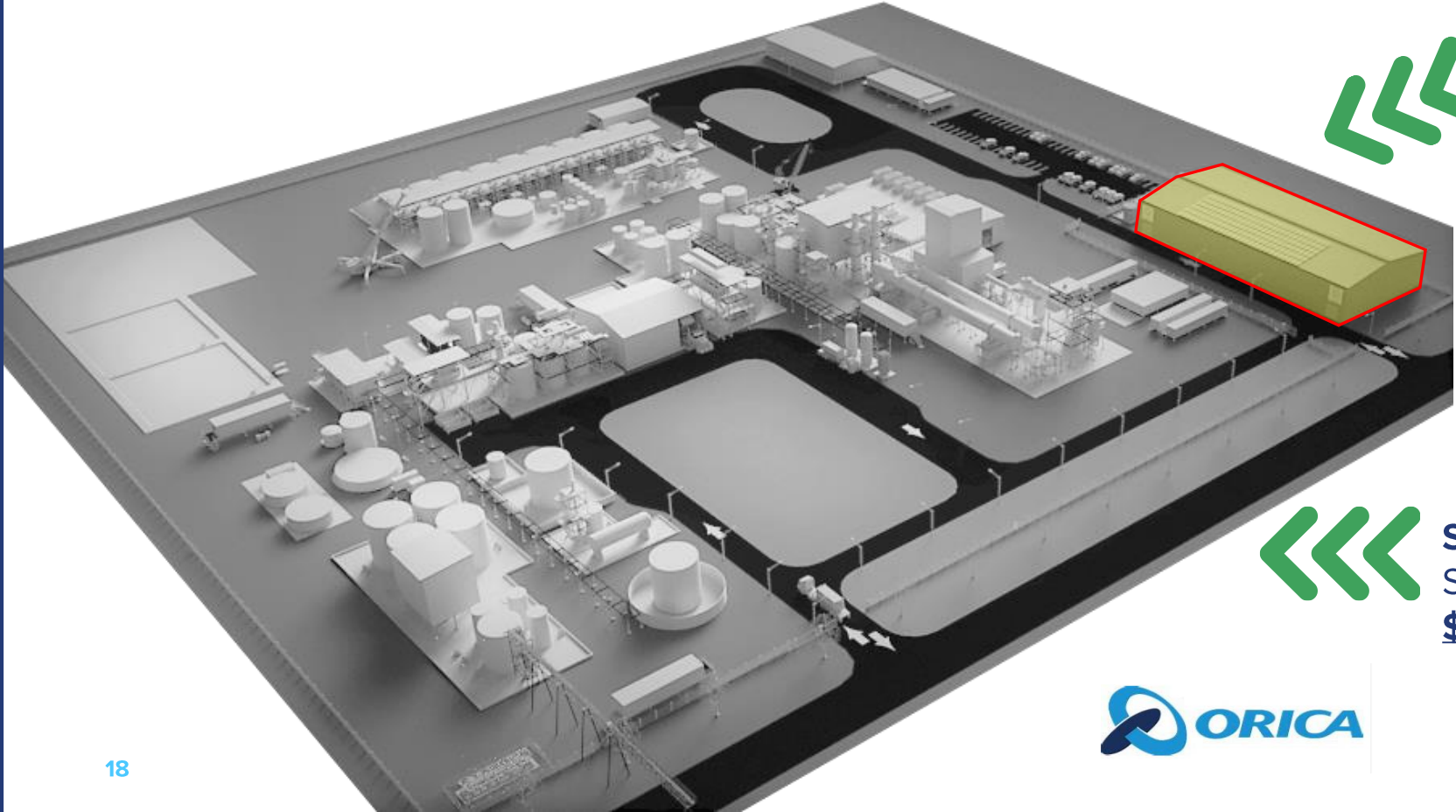
### High Purity Aluminas & Boehmite

expanding to +10tpa

**Stage 1 : HPA Line Expansion >> Underway**

# Project Layout:

**Stage 1: In Production**  
**Stage 2: Full Scale Facility**



**Stage 1: In Production – Al-Nitrate**  
**Additional \$15.5M Aust Govt Grant**

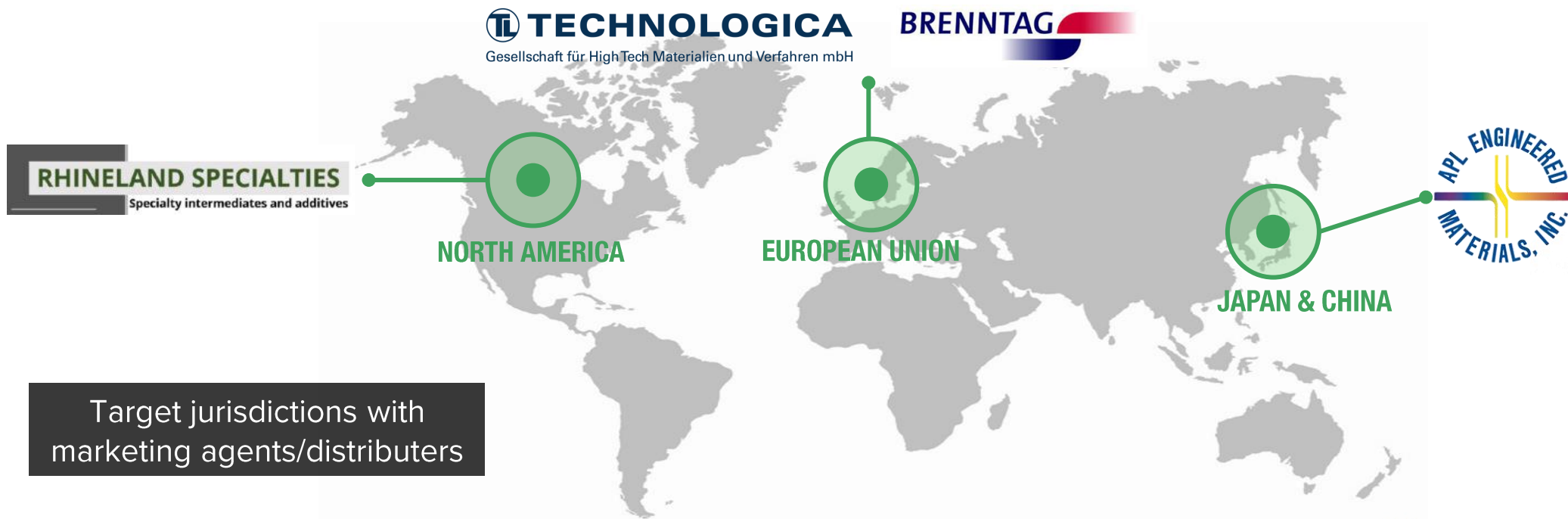


**Stage 2 – Full-scale facility on same site**  
Subject to final offtakes and financing  
**\$45M Aust Govt Grant**



# HPA First Project: Global Product Marketing

- Global marketing network well established
- >120 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
- Multiple bids submitted for high value supply contracts
- **Supplier onboarding underway with key target customers** – sustainability rating etc



# Our Customers and Partners:

- Existing customers, marketing agents and key business partnerships



# Corporate Snapshot

## TRADING INFORMATION

ASX CODE	A4N
Share Price (06/02/2023)	~59.5c
52-week trading range	37.5c – 75c
Issued Shares	857.7M

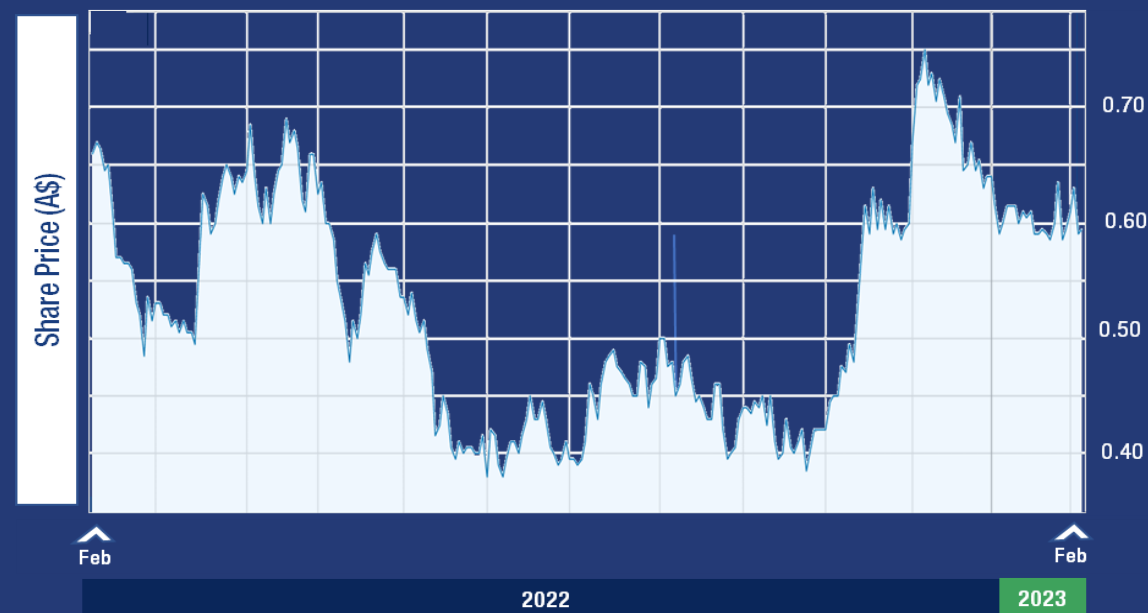
## CAPITAL STRUCTURE

Issued Shares	857.2M
Unlisted options (@35c)*	5.0M (expire 30 Sept 2023)
Unlisted options (@35c)	24.8M (expire 31 July 2023)
Unlisted options (@90c)	11.4M (expire 30 April 2025)
Unlisted options (@90c)	3M (expire 31 Aug 2025)

Market Cap	\$510M
Est Cash (01/02/2022)	~\$25M – No Debt
Enterprise Value	\$485M

\* Licensor Options

## SHARE PRICE PERFORMANCE – 12 MONTHS



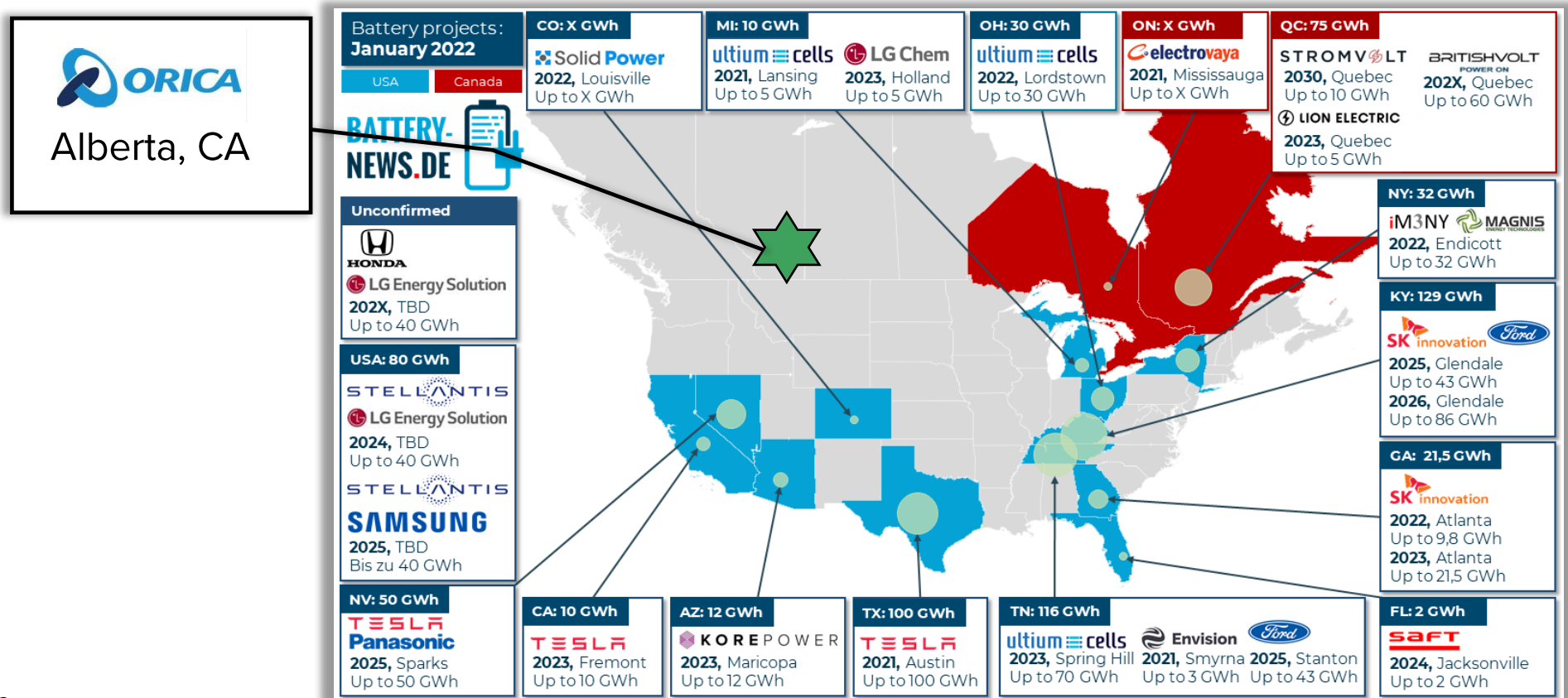
## SHAREHOLDERS

### TOP 20

	55%
Regal Funds	8.27%
Permgold P/L (N. Seckold)	7.85%
Orica Investments	5.25%

# Orica Investment:

- In November 2022, ASX 100 Company Orica Ltd (ASX: ORI) acquired a 5% strategic interest in Alpha HPA
- Orica and Alpha have worked together on the HPA First Project since 2019
- The investment builds on binding arrangements to supply chemical reagents and offtake by-products at the HPA First Project, Gladstone
- MoU signed to assess high purity aluminium products plant in North America (Alberta)
- Strategic location to supply expanding North American demand



# HPA First Project: Highlights and Catalysts



**DFS** —●

**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)



—●

**Apr '21:** MOU with Saint Gobain – all products



—●

**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:** Approval of \$45M Federal Government Grant for Stage 2



—●

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



—●

**Sept '22:** MOU with Brenntag – Worlds largest chemical distributor



—●

**Nov '22:** Orica Strategic Investment



—●

**Current:** Global Outreach >100 end-user test products shipped, 18 supply bids submitted.

**Current:** **IN PRODUCTION – STAGE 1**

Pending: Large Volume Product Offtakes

Pending: Final Multi-Product Mix and DFS Update

Pending: Project Financing and FID



# Contact

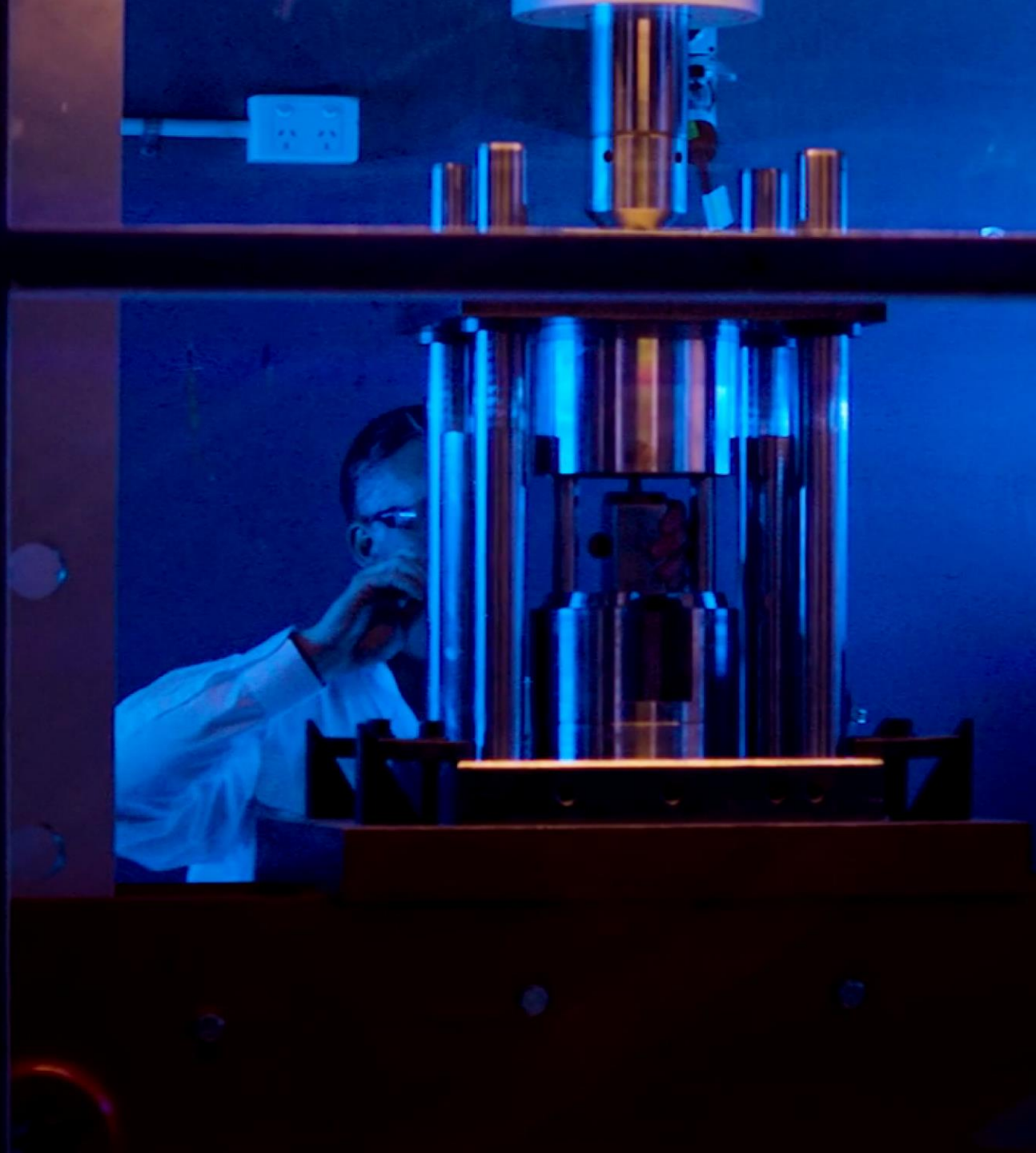
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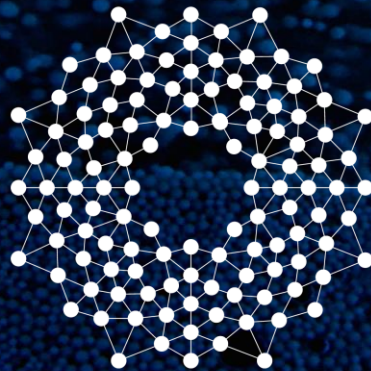
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**THANK YOU**



Alpha HPA