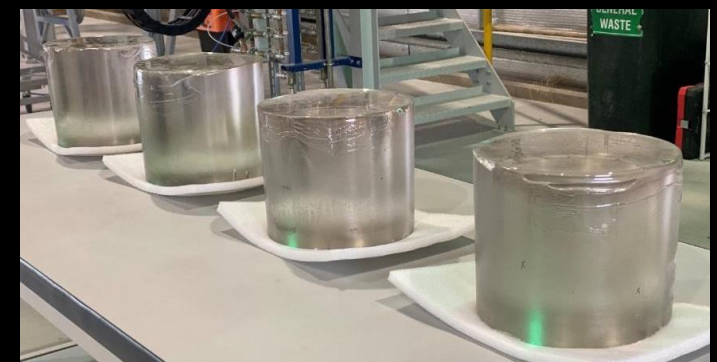


Alpha HPA



**ESTABLISHING A GLOBAL LEADING SUPPLIER OF HIGH PURITY ALUMINIUM MATERIALS TO
HIGH TECHNOLOGY GROWTH SECTORS**

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 Alpha. 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 DFS, financial condition, results of operations, and business of the Company and certain plans and objectives of the management of the Company that are based on the Company's assumptions, expectations, estimates and projections as of the date on which the statements were made. Generally, forward-looking statements can be identified by the use of forward-looking terminology such as 'outlook', 'anticipate', 'project', 'target', 'likely', 'believe', 'estimate', 'expect', 'intend', 'may', 'would', 'could', 'should', 'scheduled', 'will', 'plan', 'forecast', 'evolve' and similar expressions. 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. Although the Company attempts and has attempted to identify factors that would cause actual actions, events or results to differ materially from those disclosed in forward looking statements, there may be other factors that could cause actual results, performance, achievements or events not to be as anticipated, estimated or intended, and many events are beyond the reasonable control of the Company. Investors should consider the forward looking statements light of those disclosures and are cautioned not to place undue reliance on forward looking statements. The Company disclaims any intent or obligations to or revise any forward-looking statements whether as a result of new information, estimates, or options, future events or results or otherwise, unless required to do so by law.



ALPHA HPA: INTRODUCTION

We are a technology led, speciality chemicals company

We make **ultra-high purity aluminium products** with a
worlds first process which are:

**CRITICAL RAW MATERIALS FOR
HIGH-TECHNOLOGY GROWTH SECTORS**

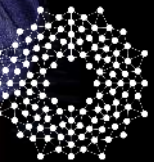
HIGH PURITY - HIGH MARGIN - LOW CARBON

Alpha is commercialising in 2 Stages as the

HPA FIRST PROJECT

STAGE 1 – IN PRODUCTION

STAGE 2 – IN CONSTRUCTION



Alpha HPA



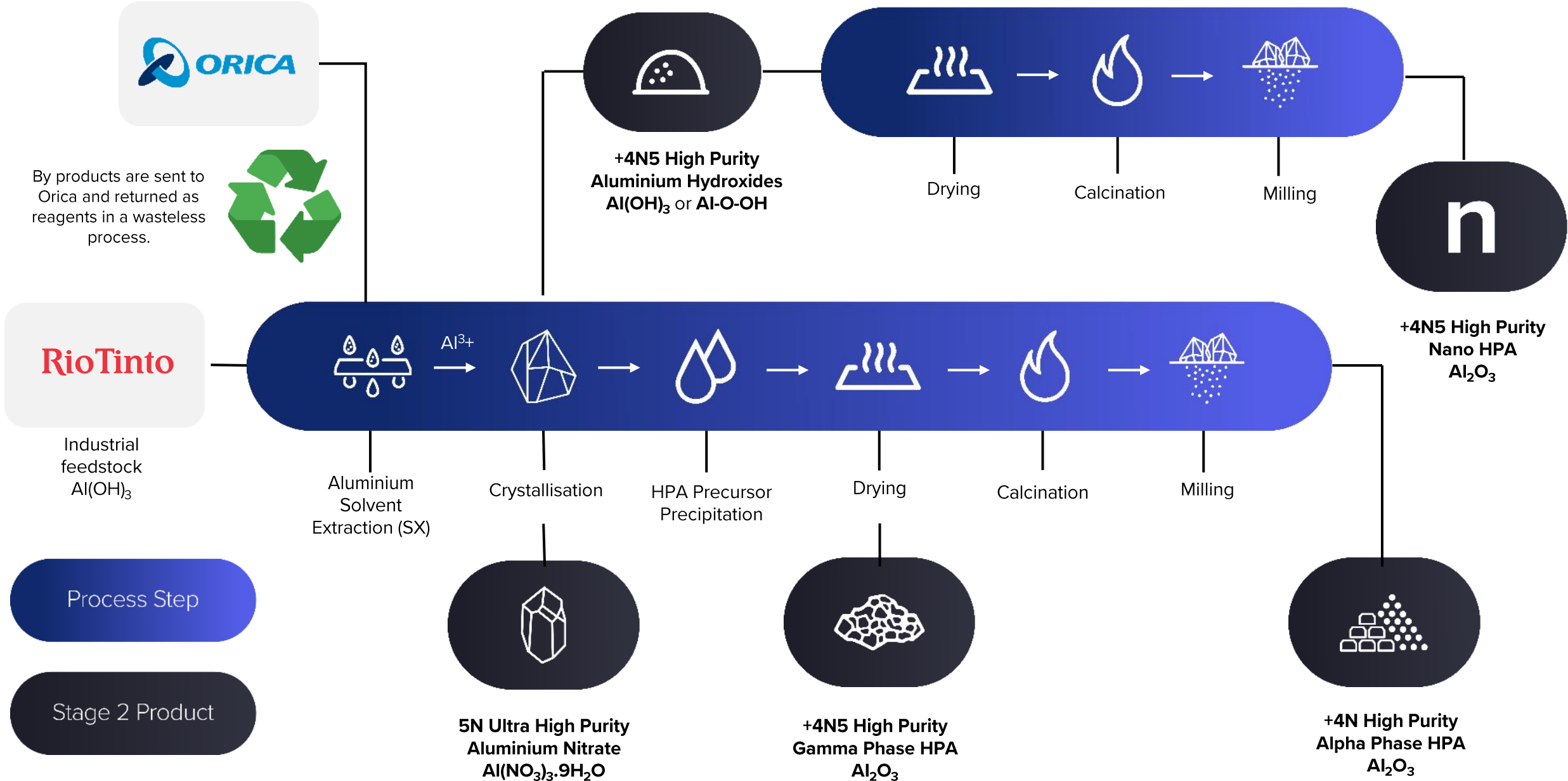
- **STAGE 1: IN PRODUCTION**
- **STAGE 2: IN CONSTRUCTION**

**HPA First Project Site
Gladstone State Development Area
100% RENEWABLE ENERGY**

HPA FIRST PROJECT: GLADSTONE QLD

OUR PROCESS AND TECHNOLOGY

Novel, low energy, low –carbon process



COMPREHENSIVE GOVERNMENT SUPPORT



Alpha staff hosting Prime Minister of Australia Anthony Albanese, Federal Minister of Resources Madeleine King, Queensland Premier Steven Miles, and Queensland Minister for Regional Development & Water Glenn Butcher



**\$21.7m IPP
Grant**



**\$45M MMI-C
Grant**



**\$320M Loan
facility
+
\$80M cost
overrun facility**





STAGE 1: IN PRODUCTION



Alpha HPA



STAGE 1: IN PRODUCTION

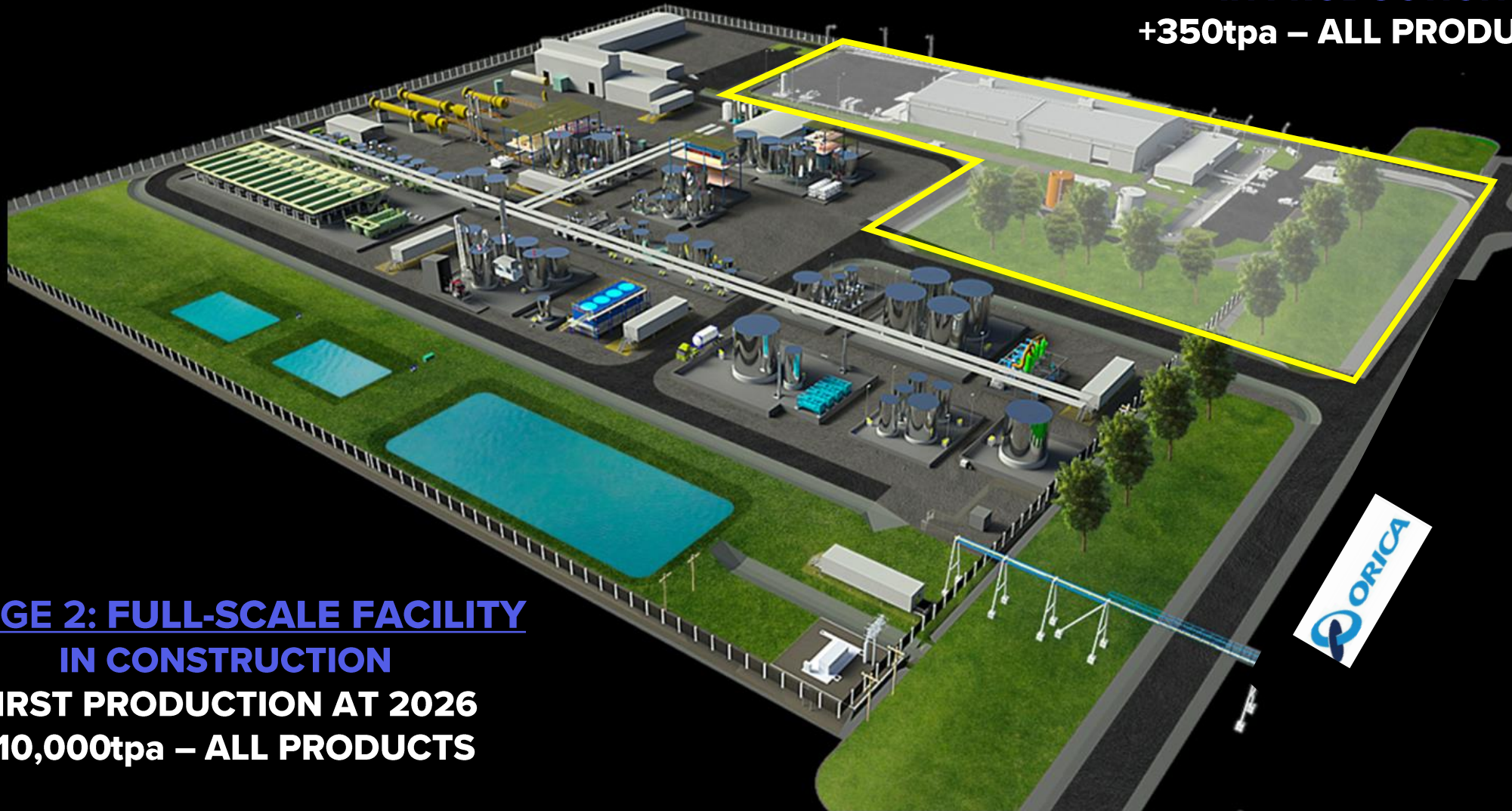


Alpha HPA

PROJECT LAYOUT:

STAGE 1:
IN PRODUCTION
+350tpa – ALL PRODUCTS

STAGE 2: FULL-SCALE FACILITY
IN CONSTRUCTION
FIRST PRODUCTION AT 2026
+10,000tpa – ALL PRODUCTS





Stage 2 Bulk Earthworks – December 2024

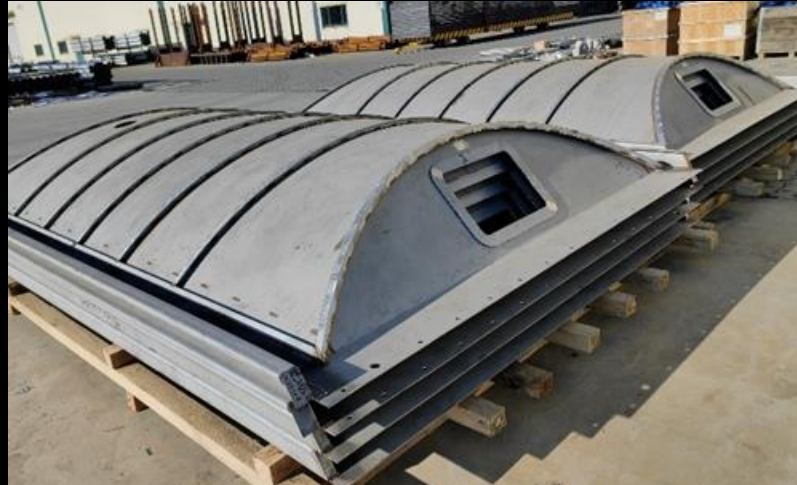
STAGE 2 : CONSTRUCTION UNDERWAY



Alpha HPA



SX mixer tank shells



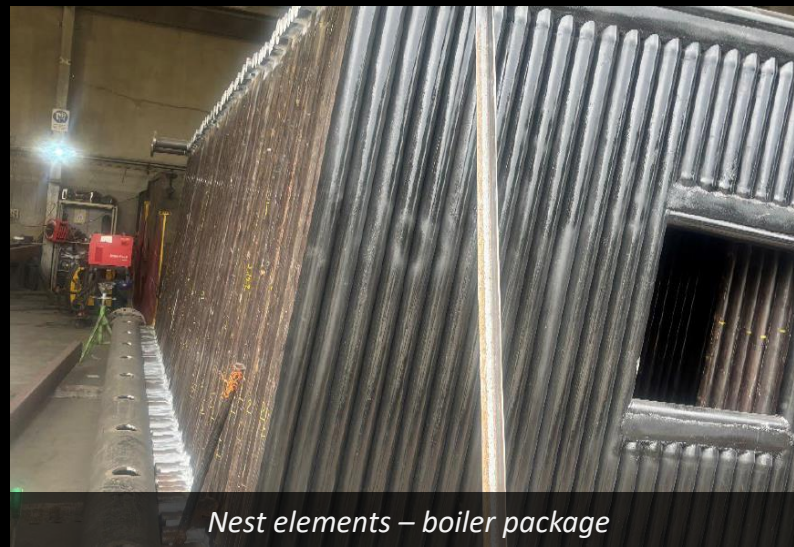
SX settler covers



Lining of bio-retention ponds



SX interconnects



Nest elements – boiler package

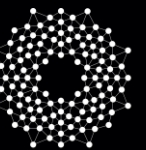


Civil works for utilities connection

STAGE 2 : CONSTRUCTION UNDERWAY

PRODUCT MARKETING HIGHLIGHTS

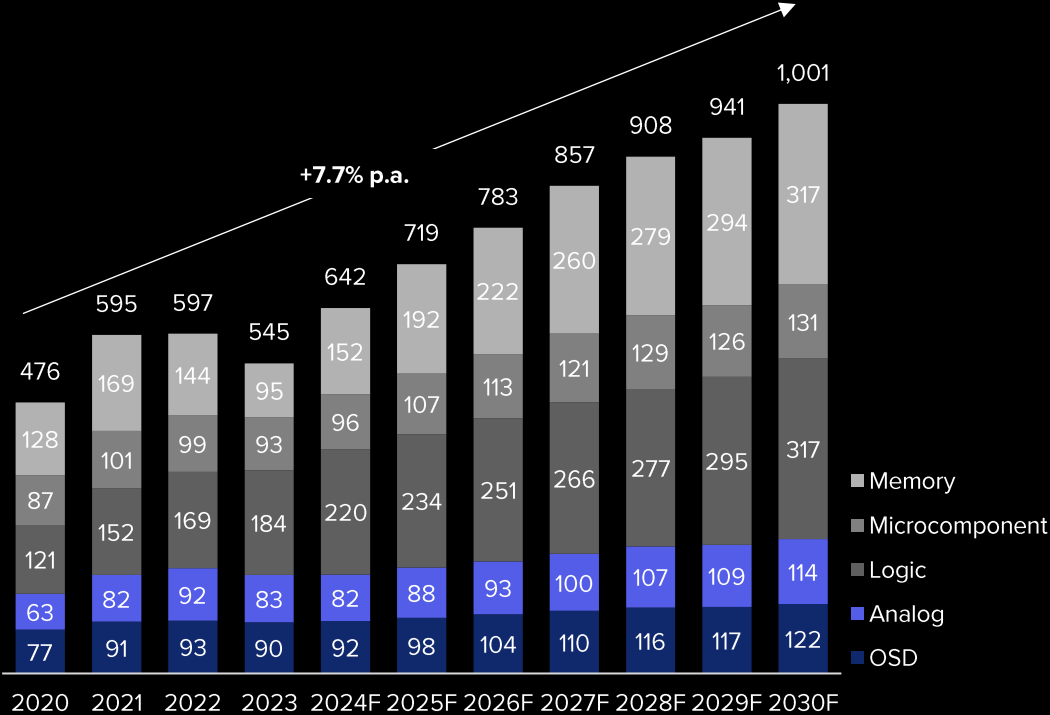
- **MATERIAL LIFT IN STAGE 1 SALES ORDERS AS TECHNICAL QUALIFICATION MATURES**
 - Pricing signals for ATH products materially higher than DFS
- **SEMICONDUCTOR SECTOR DEMAND ESCALATING RAPIDLY DRIVEN BY AI/DATA CENTERS AND POWER ELECTRONICS**
 - Alpha's materials uniquely match the discrete purity profile required
 - 2 Letters of Intent (LOI) in the sector, including market quality leader
 - A further 3 LOI's in draft
 - Co-operating with HPA incumbents to maximise market penetration
- **DIRECT LITHIUM EXTRACTION (DLE) DEMAND ESCALATING WITH ENTRANCE OF PETROLEUM MAJORS**
 - Alpha's ATH crystal matrix uniquely suited to DLE sorbent performance
 - Testwork showing > 2x baseline lithium extraction
 - Test work expands to +10 counterparties
- **AL-NITRATE BASED COATINGS (ULTRACOAT) TECHNICALLY PROVEN TO DRAMATICALLY LIFT LITHIUM-ION BATTERY SAFETY**
 - Technical Acceptance letter with anode market leader after 18months testing
 - Testwork and qualification underway with 10 anode OEM's and developers
 - UltraCoat expanded to battery casings



SEMICONDUCTOR SECTOR GROWTH

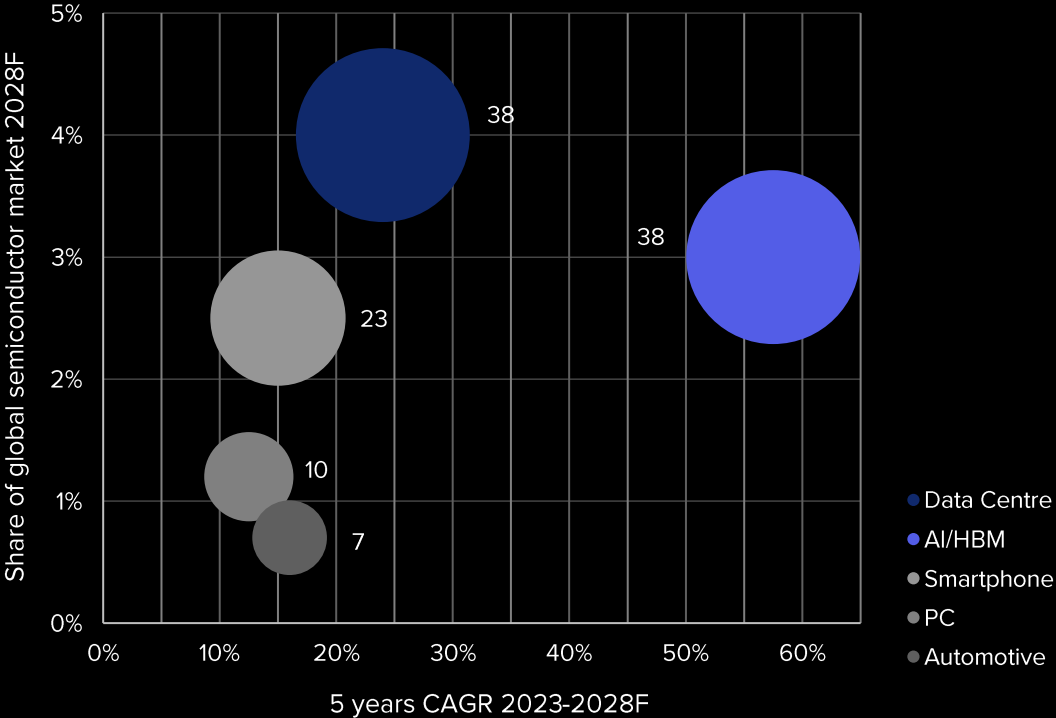
- The global semiconductor sector is undergoing extraordinary growth driven by AI/data centres and power semiconductors for the energy transition

Global Semiconductor market by component type, 2020 – 2030 (\$bn)



Source: Omdia Q3 2024; OSD – Optoelectronic, sensor and discrete

DRAM market by application in share of global semiconductor market (%) and 5-year CAGR 2023-2028 (%)



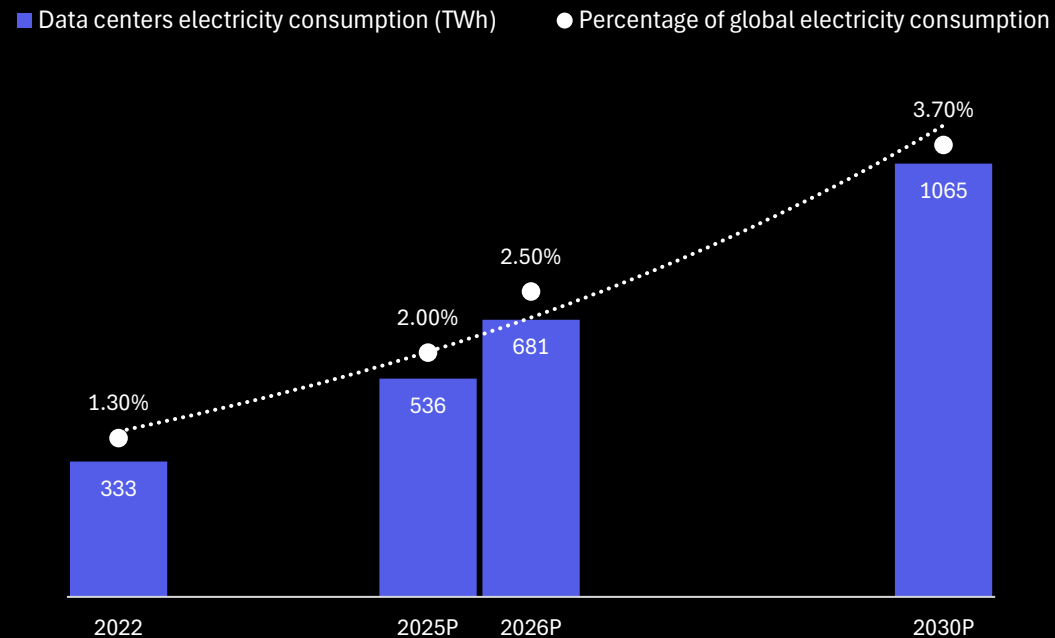
Source: Omdia Q3 2023



ENERGY DEMAND FOR AI DATA CENTRES

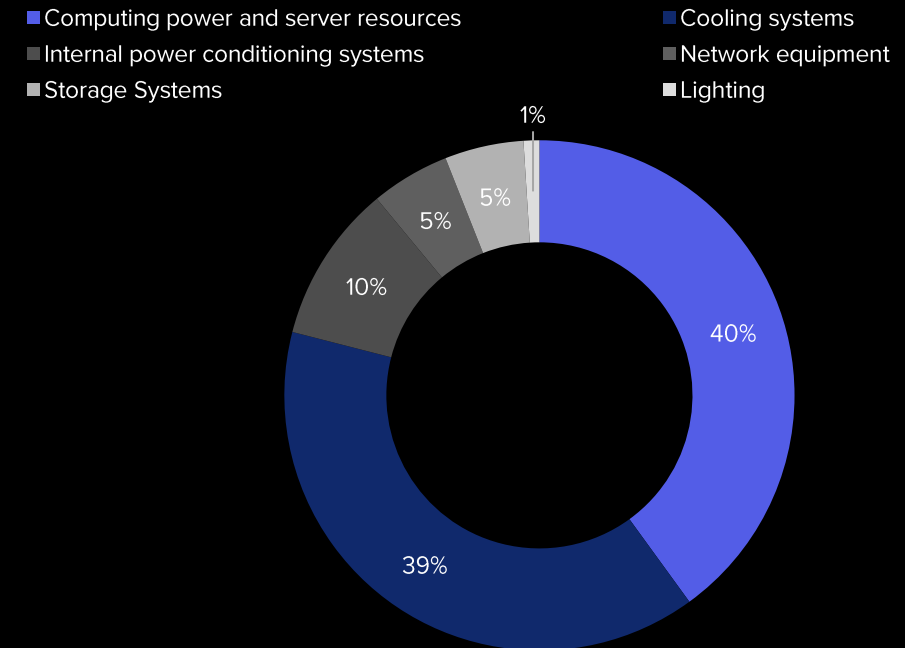
- Electricity demand for AI data centres is surging, with **40% of electricity for cooling**
- **Placing intensive focus on thermal management**

Data centers' electricity consumption set to surge through 2030, globally, largely driven by power-intensive AI models - specifically gen AI



Source: Deloitte Analysis

Computing power and cooling systems drive much of the energy consumption in AI data centers

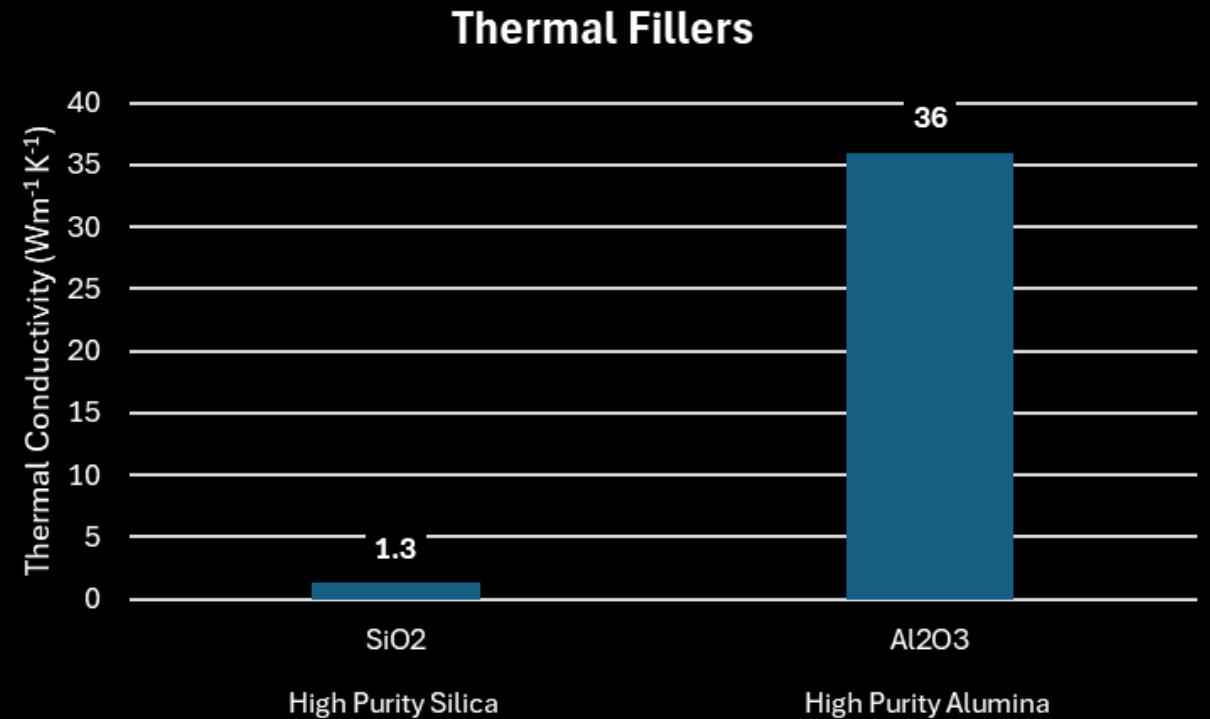
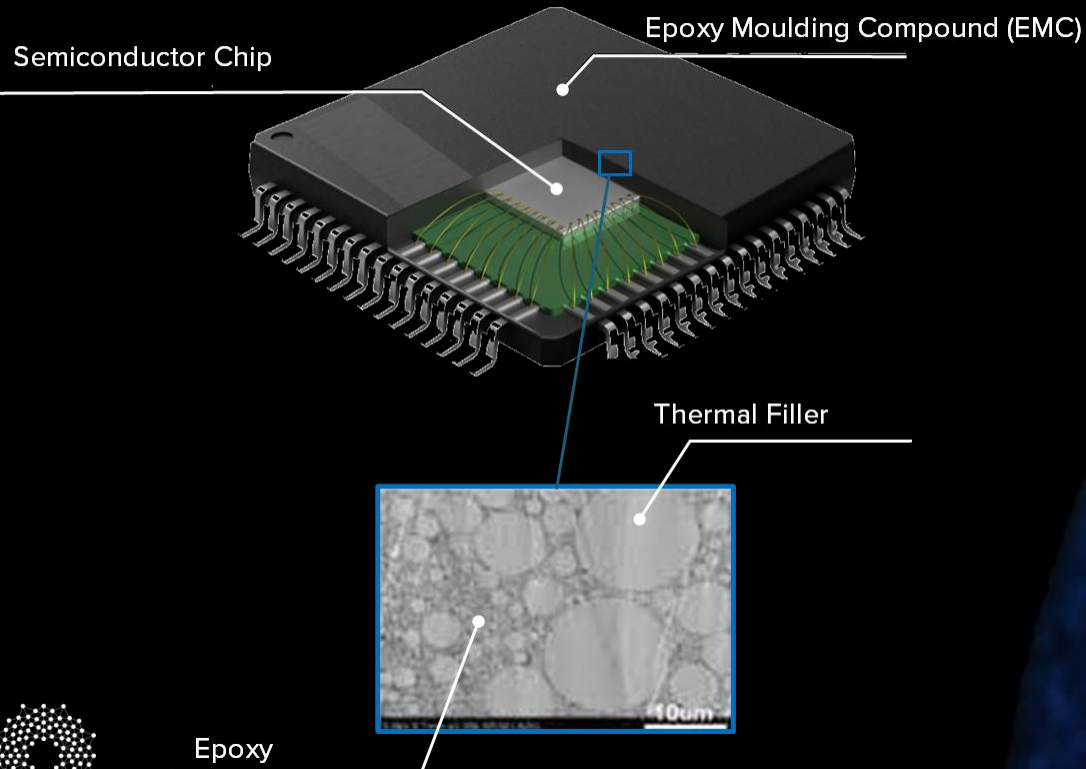


Source: Deloitte Analysis



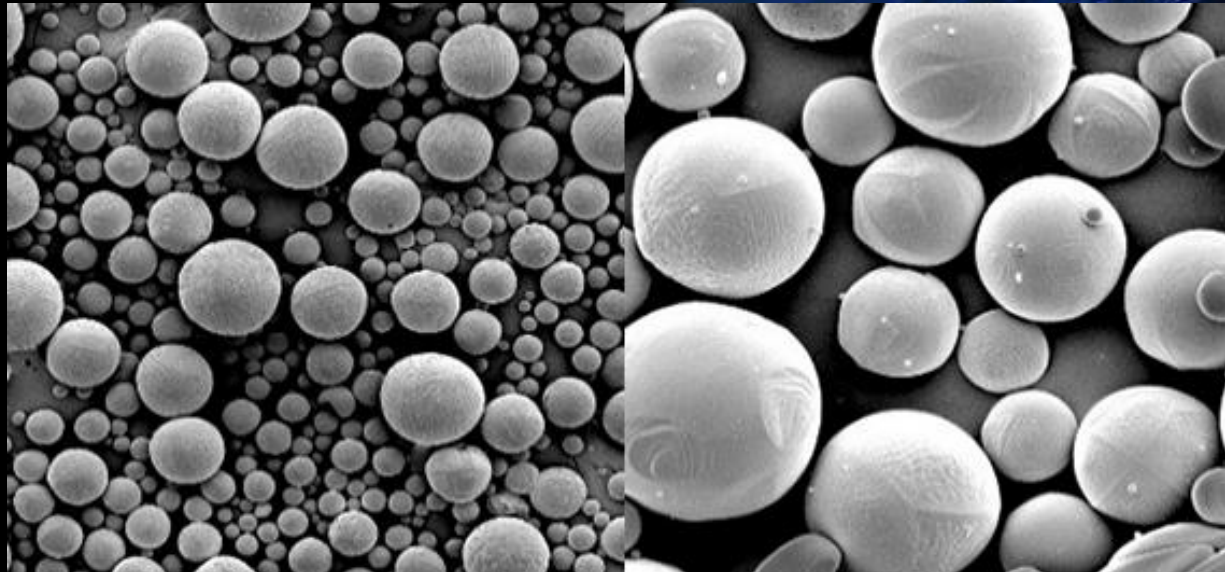
GROWING DEMAND FOR HPA IN THERMAL FILLERS

- Faster processing power is driving energy demand for cooling
- Increased thermal conductivity in semiconductor encapsulation now a necessity
- Superior thermal conductivity is driving alumina demand over the use of incumbent silica



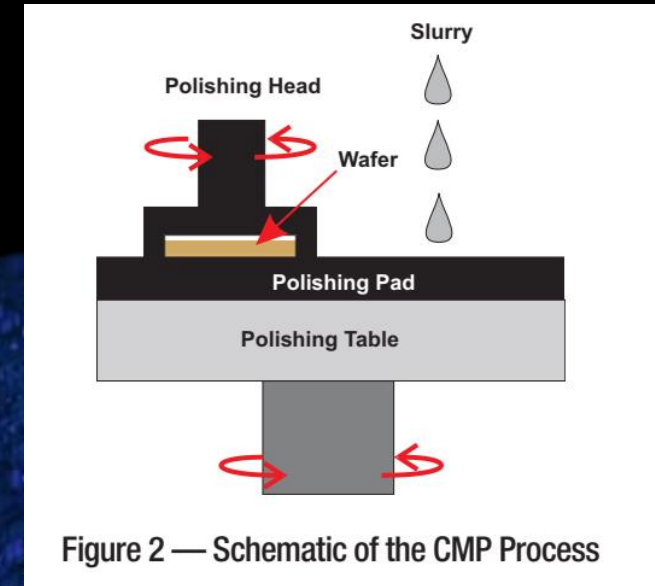
ALPHA'S MATERIALS FOR THERMAL FILLERS

- Purity standard for thermal fillers for new-generation semiconductors are extremely stringent and must contain ZERO detectable radio-nuclides (or less than 1 part per billion)
- Radio-nuclides emit alpha (α) particle radiation which disrupt secondary signals and create 'soft errors'
- Alpha HPA's novel purification process removes all radio-nuclide impurities, unlike incumbent manufacturers, making it ideally suited to meet the thermal filler application
- Alpha has already commenced small scale commercial sales to leading thermal filler end-users in South Korea and Japan, and expects to shortly complete another Letter of Intent with a leading Japanese manufacturer.

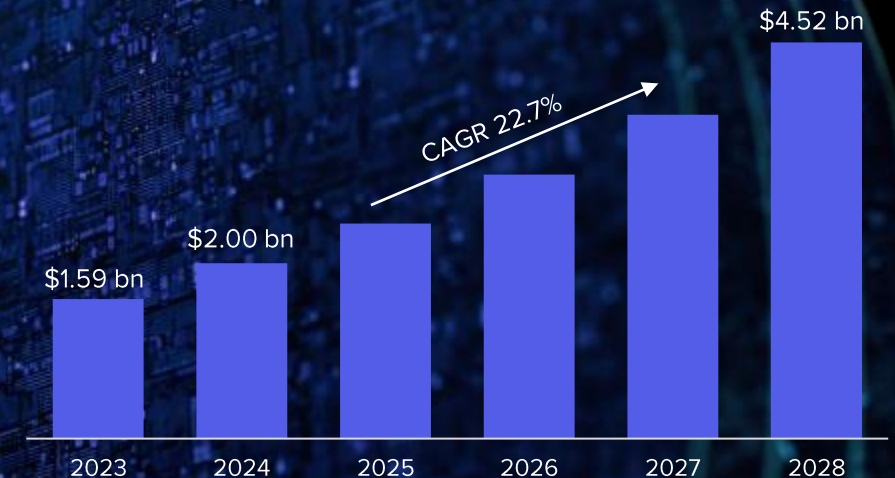


HIGH PURITY ALUMINAS IN CMP POLISHING

- Semiconductor substrates and stacked circuit layers are polished with a process referred to as CMP, which stands for Chemical, Mechanical Planarization.
- CMP uses chemically abrasive slurries which to date have typically included silicon and yttrium oxide.
- The rapid growth of harder substrates for power-semiconductors, such as:
 - Silicon Carbide (SiC)
 - Gallium Nitride (GaN) and
 - Sapphire (Al_2O_3)
- Is rapidly leading to more high purity alumina (HPA) as the preferred CMP abrasive.



Silicon Carbide Semiconductor Device Global Market Report 2024

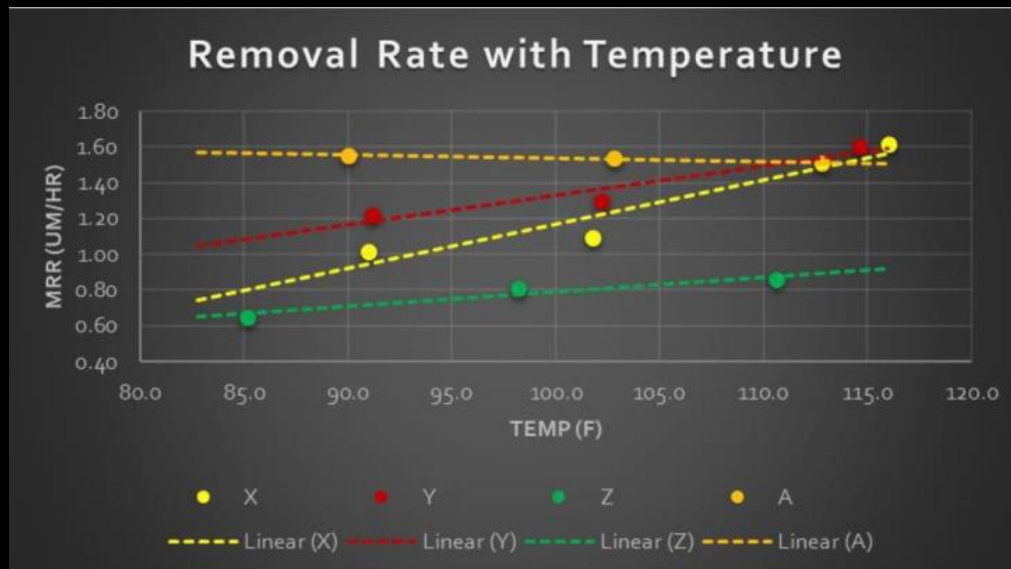


Source: The Business Research Company



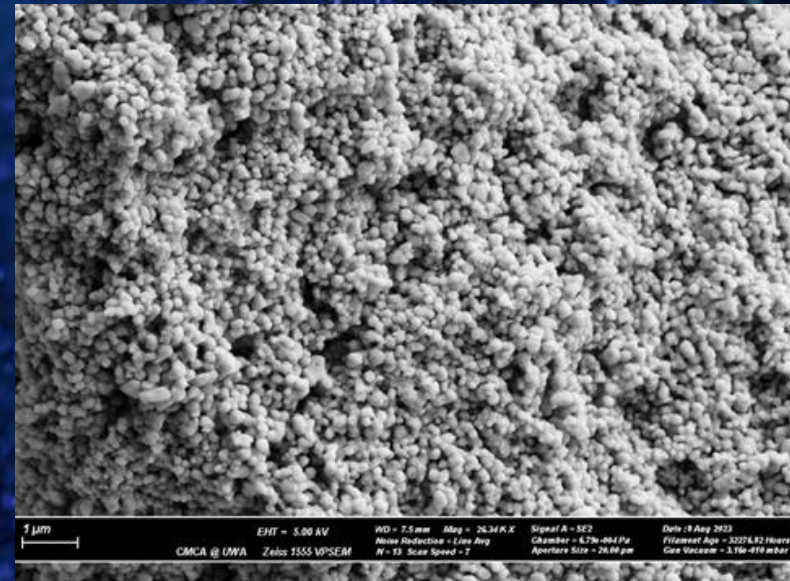
ALPHA'S MATERIALS IN CMP POLISHING

- Alpha's novel process can produce aluminas with a unique particle shape and impurity profile that is uniquely suited to high-performance CMP slurry abrasive applications
- Alpha's materials have been independently tested to show higher CMP removal rates than incumbent CMP slurries at lower temperatures, reducing warping of the substrate
- Alpha has commenced small scale commercial sales to leading CMP end-users in the US and is in advanced qualification with end-users in Japan, China and the US



Alpha's HPA (Linear A) outperforms incumbents CMP slurries on SiC substrates.

Source: Innovation Impact



Alpha's HPA novel HPA particle shape
(nano HPA product shown)



Alpha HPA

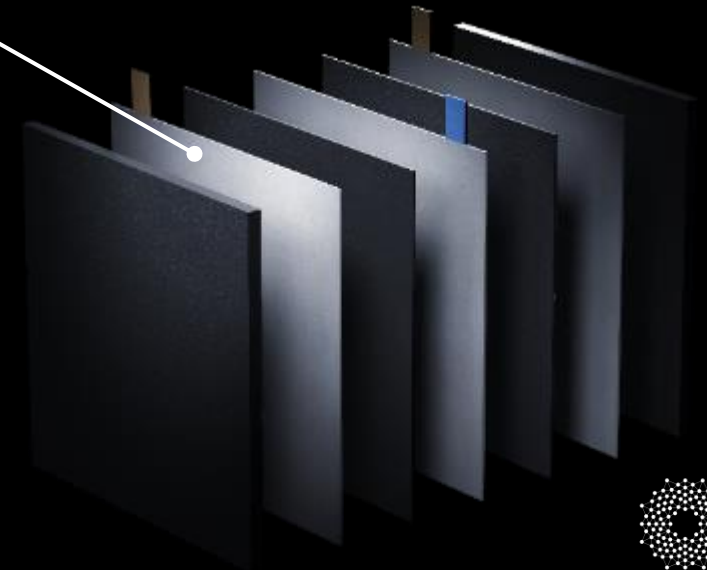
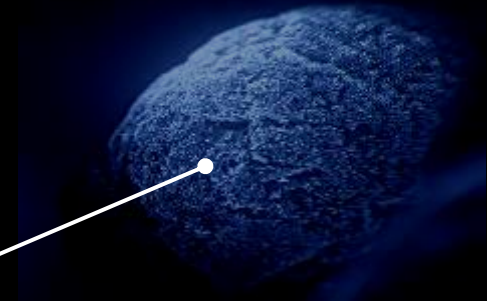
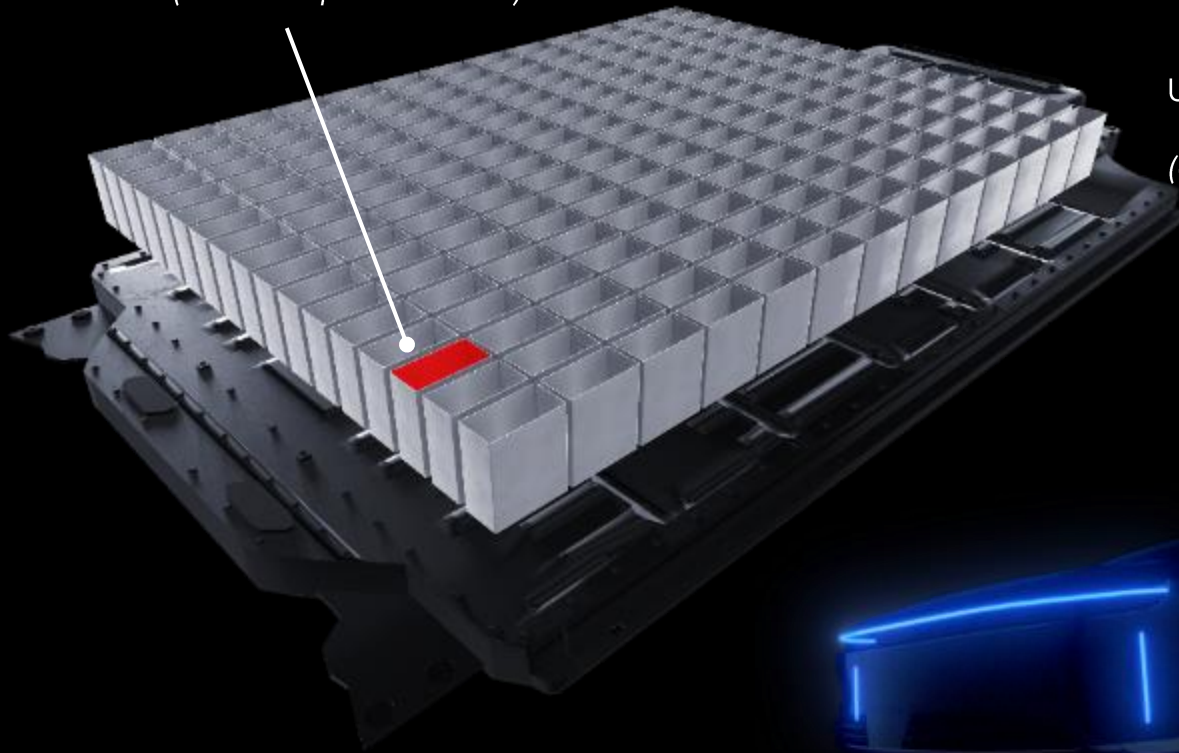
WE MAKE BATTERIES SAFER

ALPHA'S HIGH PURITY MATERIALS UNLOCK KEY Li-ION BATTERY SAFETY TECHNOLOGY

Technical Acceptance reached with a leading Li-B anode OEM after 18months

Zero propagation from battery pack with high purity
(Al-O-OH) boehmite coated cell casings
(Utilises Alpha Al-Nitrate)

Up to 100% reduction in thermal runaway with coatings on
graphite anode materials
(Utilises Alpha Al-Nitrate and high purity alumina hydrates)

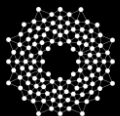


BATTERY CELL CASE COATINGS

Al-hydroxide coated cell casings propagation control of thermal runaway within the battery pack.



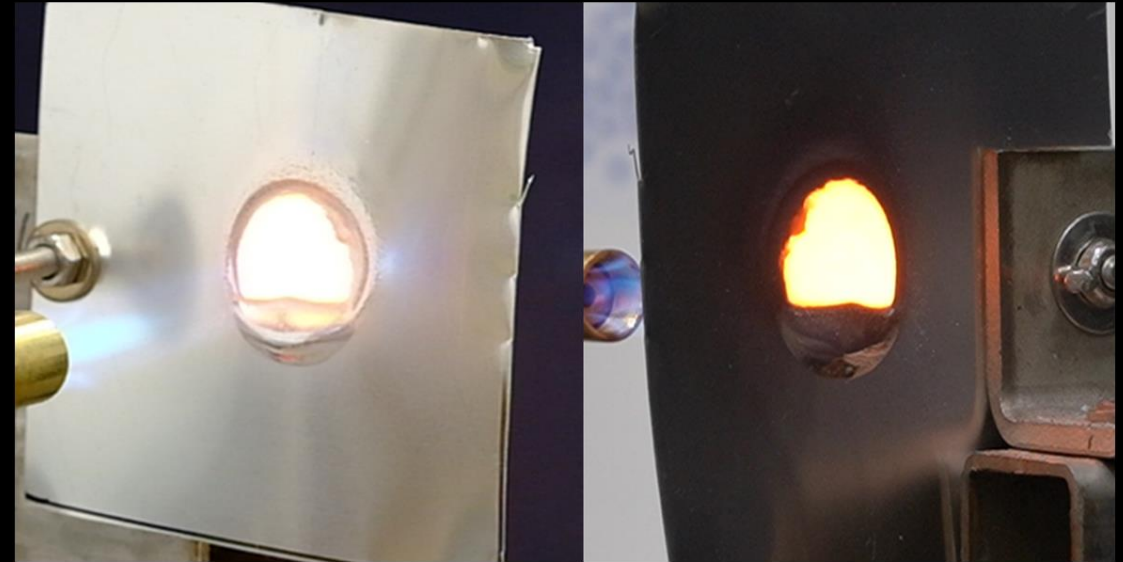
Rapid, high purity Al-hydroxide coating
(for OEM – 40% global supply)



Alpha HPA

Front View

Rear View



UNCOATED ALUMINIUM
15 seconds under butane flame

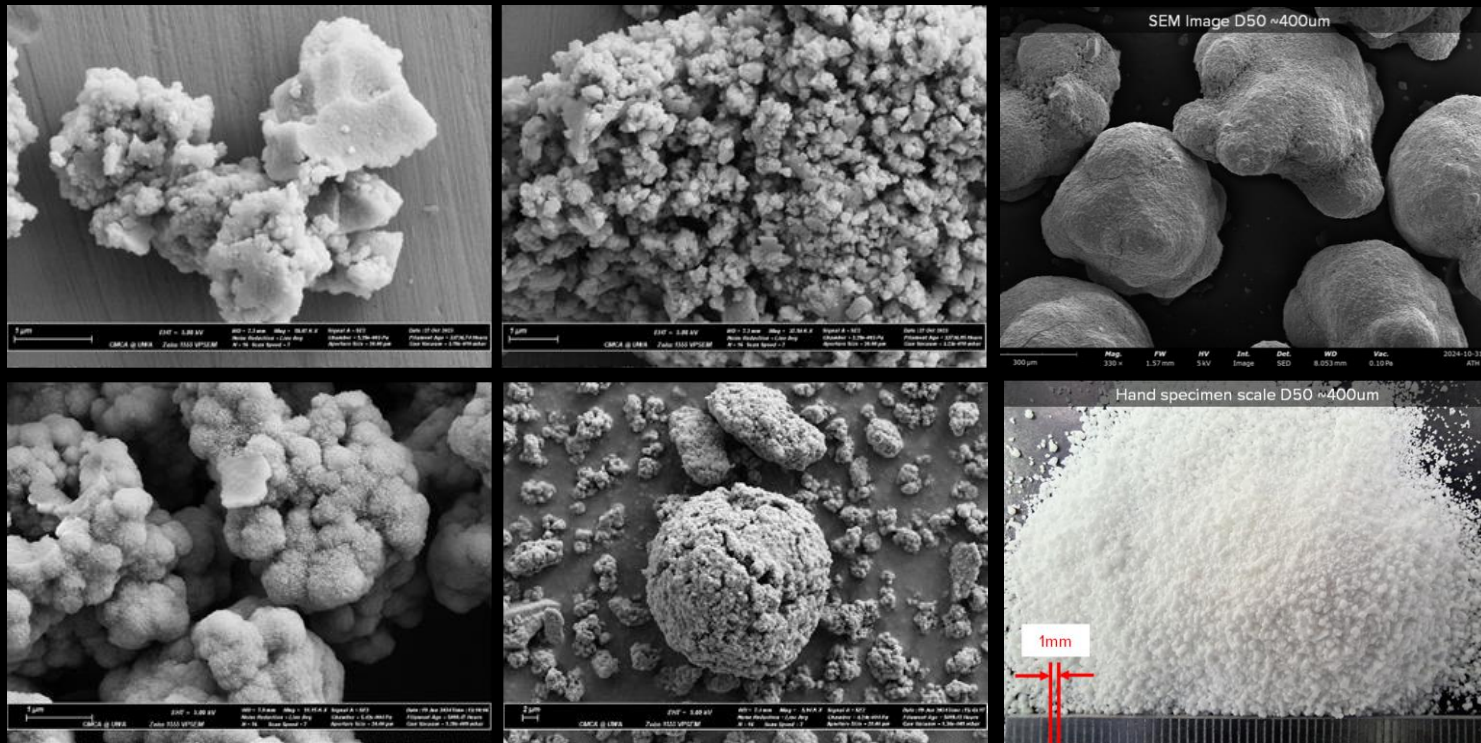


ULTRA-COATED ALUMINIUM
Layer integrity intact after 9 minutes under butane flame

DLE SORBENTS

Growing demand from Direct Lithium Extraction (DLE) sorbents

- Aluminium based DLE sorbent made from high-purity alumina-hydrate ($\text{Al}(\text{OH})_3$ or 'ATH')
- Testwork and commercial demand growing rapidly with entry of petroleum majors
- Alpha has a **unique ability to manufacture high purity ATH as 100% amorphous**
- Testwork has now expanded to over 10 counterparties



A range of high purity alumina hydrates offered by Alpha for DLE end users

MARKET OUTREACH AND PRICING

- Extensive 4+ year global market outreach
- Detailed, technically driven understanding of market and applications
- Pricing obtained by interviews, sales, refined quotations and customer LOIs
- Comprehensive database of pricing available for Alpha's materials
- Alpha in product qualification testing for >40,000tpa product demand
- B2B pricing protected from any index volatility
- **Pre-commercial sales orders building since FID, +5,000kg @ ~ US\$25/kg**

Product Pricing (US\$/kg)					
Product	Alpha HPA Market Discovery		Independent Consultants		
	Vol Weighted Avg*	HPA Eq**	CM Group (CY27)	GLG	HPA Eq**
5N Purity Aluminium Nitrate	18.5	123.3	n/a	20 - 30	125.0
4N5+ Purity Alpha Phase Alumina	32.0	32.0	39.3	n/a	39.3
4N5+ Purity Alumina for pucks	25.0	25.0	35.0	n/a	35.0
4N5+ Purity Gamma Phase Alumina	20.3	20.3	27.5	n/a	27.5
4N5+ Purity Alumina Trihydrate	15.0	23.1	19.4	n/a	29.8
4N5+ Purity Nano-Alumina	43.0	43.0	50.0	n/a	50.0

USA

- Semiconductor
- Li-ion battery
- LED lighting
- Specialty Ceramics

Demand +15,000tpa
Counterparties: +25



EU

- Li-ion battery
- LED lighting
- Catalysts
- Specialty Ceramics

Demand +15,000tpa
Counterparties: +20

Japan

- Semiconductor
- Li-ion battery
- Specialty Ceramics

Demand +2,000tpa
Counterparties: +10



China

- Li-ion battery

Demand +10,000tpa
Counterparties: 4



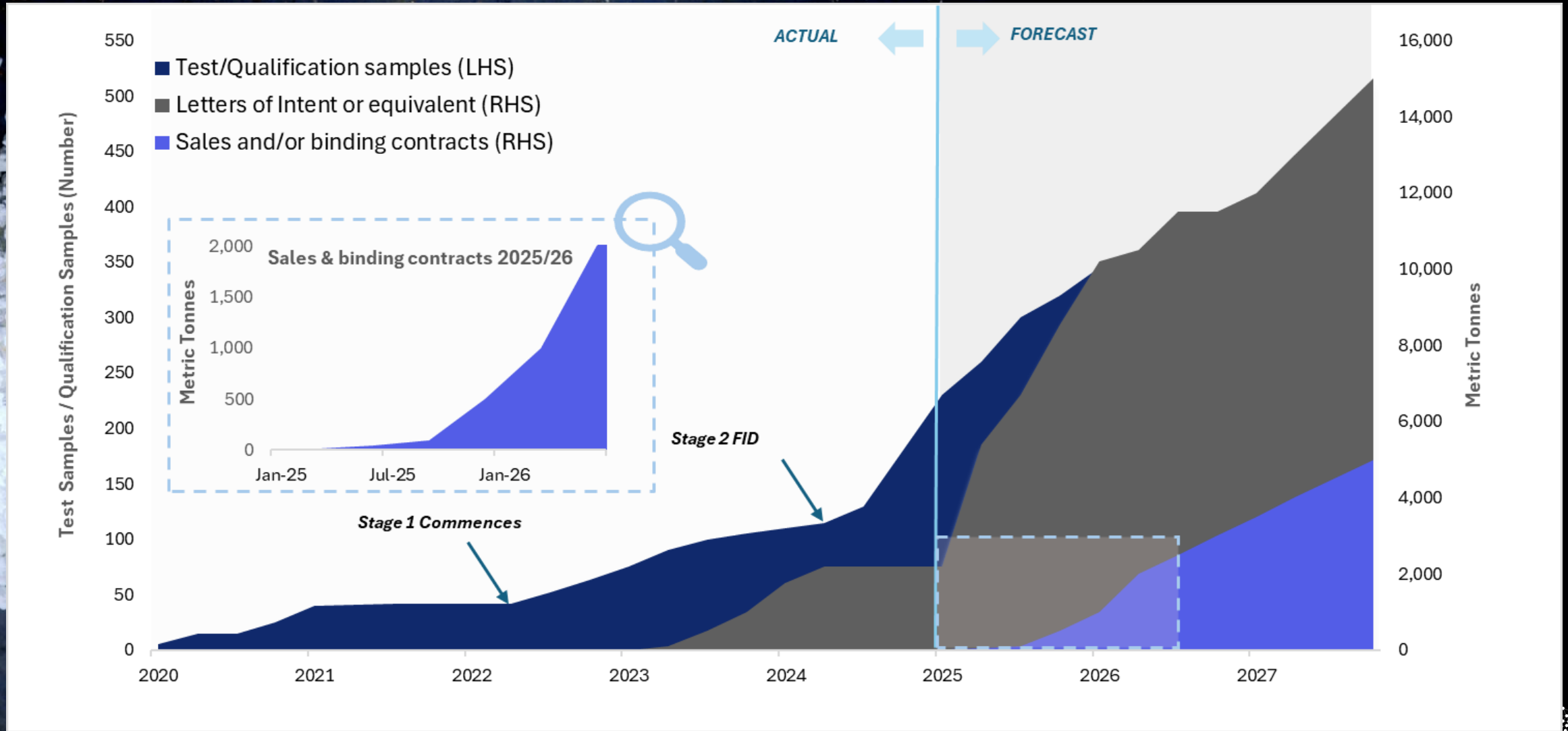
South Korea

- Semiconductor
- Li-ion battery

Demand +1,000tpa
Counterparties: +6

Note: *Demand Vol Weighted Average: Average prices weighed by volumes indicated from customers and potential end-users, and/or sales achieved. ** HPA Eq: Is calculated from Demand Vol Weighted Average.

PRODUCT MARKETING PROGRESSION



STAGE 2 DFS: STRONG FINANCIAL METRICS

Compelling HPA First Project Stage 2 financial metrics, ramping up to 87% throughput by FY28 and steady-state production in FY30

HPA First Project Stage 2 Steady-state Financials

(does not include Alpha Sapphire)

Steady state (FY30) ¹	Units	Alpha HPA Price Discovery Case	Mid Case	Independent Pricing Case
CapEx (includes \$79M contingency)	A\$	\$553M	\$553M	\$553M
Production volume	tpa	10,430	10,430	10,430
Weighted average product price	A\$/kg	\$34.44	\$42.34	\$48.77
Revenue	A\$	\$359M	\$442M	\$509M
Unit cash costs (after by-product credits) ²	A\$/kg	\$9.58	\$9.58	\$9.58
EBITDA	A\$	\$255M	\$336M	\$403M
Pre-tax free cash flows	A\$	\$251M	\$333M	\$399M
HPAeq volume	tpa	6,850	6,850	6,850
HPAeq price ³	A\$/kg	\$52.44	\$64.47	\$74.26

A\$359M – A\$509M

Annual Revenue

~71% - 79%

EBITDA Margin

A\$251M – A\$399

Pre-tax free cash flows

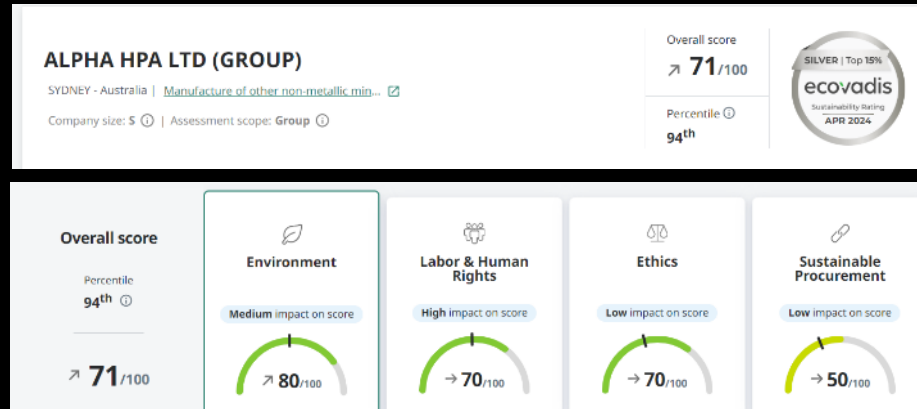
First Project Stage 2
Production volume ramp up (tpa)



Note: 1. Revenue grows to A\$359m – A\$509m and EBITDA grows to A\$255m – A\$403m by FY30 reflecting 100% utilisation. EBITDA assumed to be post Payroll tax and royalties. Range based on the Product Pricing Scenarios Alpha HPA Price Discovery Case and Independent Pricing Case as disclosed in the HPA First Project Stage 2 Commercialisation announcement on 20 May 2024. 2. Operating Cost estimate does not include any potential impact of the Budget measures relating to critical minerals tax credits delivered as part of the Federal Budget on Tuesday 14 May 2024. 3. The sale of Al-Nitrates (high purity aluminium salt), which have lower aluminium content than high purity aluminas but a close to equivalent sales value by unit weight, provides a lift in HPAeq price received versus the HPA weighted average product price.

ESG: INDEPENDENT CERTIFICATION

SUSTAINABILITY RATING



SUSTAINABILITY

ISO CERTIFICATION



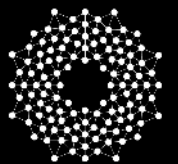
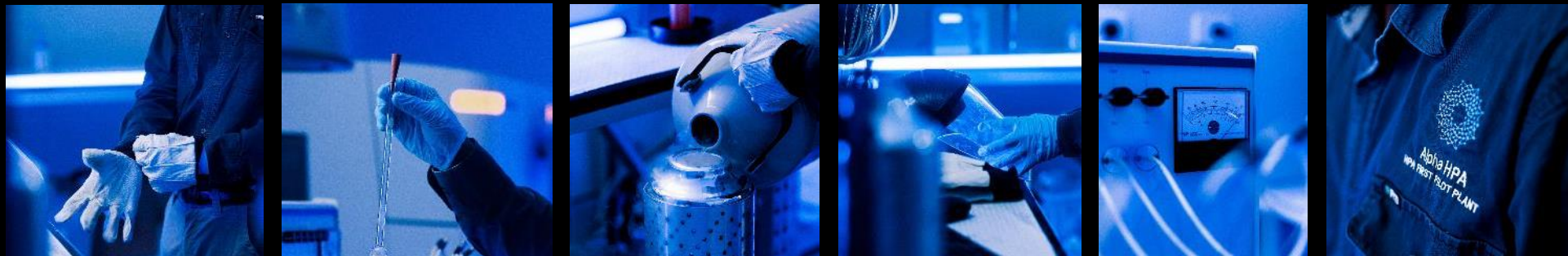
QUALITY



ENVIRONMENTAL MGMT



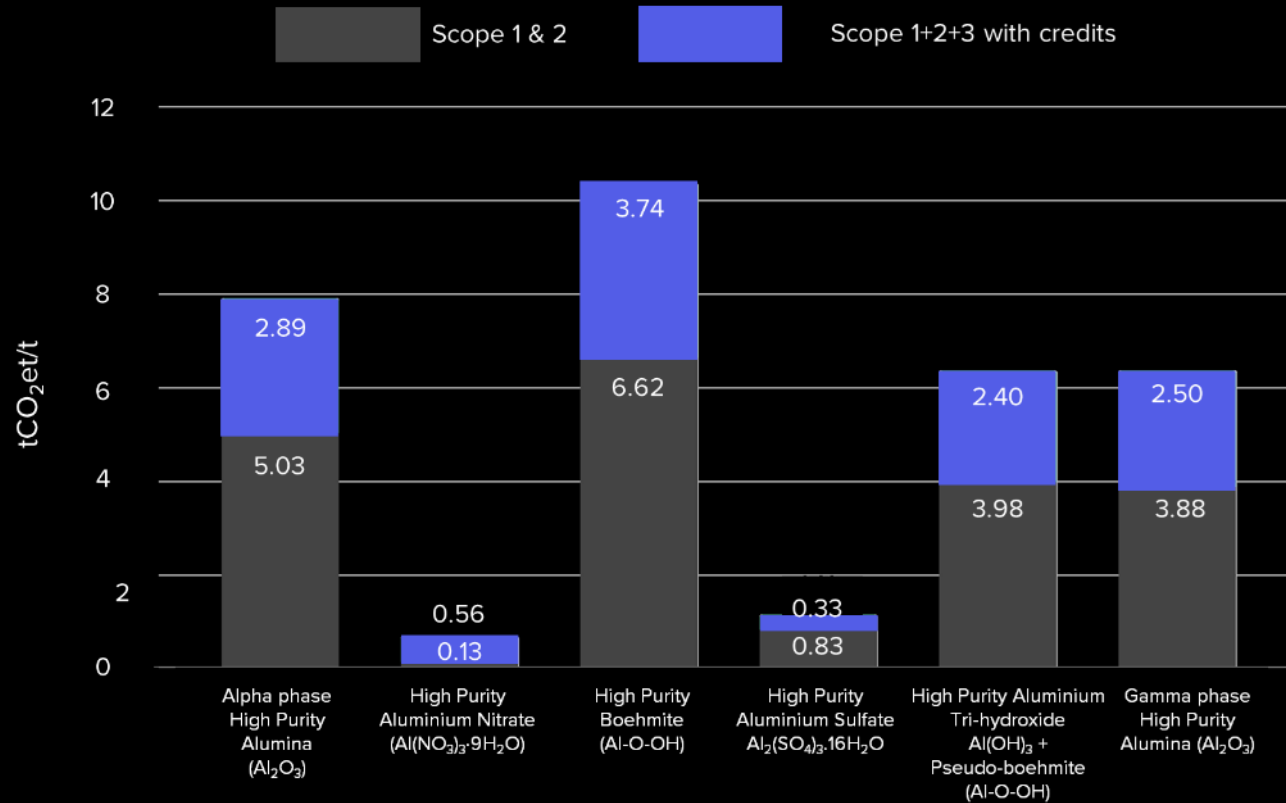
WORK, HEALTH & SAFETY



Alpha HPA

WORLD LEADING EMISSIONS


50-70% lower CO₂ emissions over incumbent (alkoxide) process

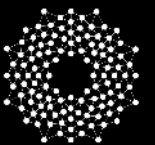


~71% lower total emissions in feedstock and production process combined compared to the incumbent process

EMISSIONS REDUCTIONS

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

Independent emissions analysis by 



Alpha HPA

ALPHA SAPPHIRE: ADDING DOWNSTREAM VALUE TO HPA

Alpha Sapphire is capturing downstream value add with the conversion of our HPA to synthetic sapphire using new sapphire growth technology



- Now qualifying for new 8" sapphire wafer demand from GaN-on-Sapphire semiconductors
- **Sapphire optics sales commenced**
- \$30M QIC funding to secure sapphire business for QLD – extended to June 2025

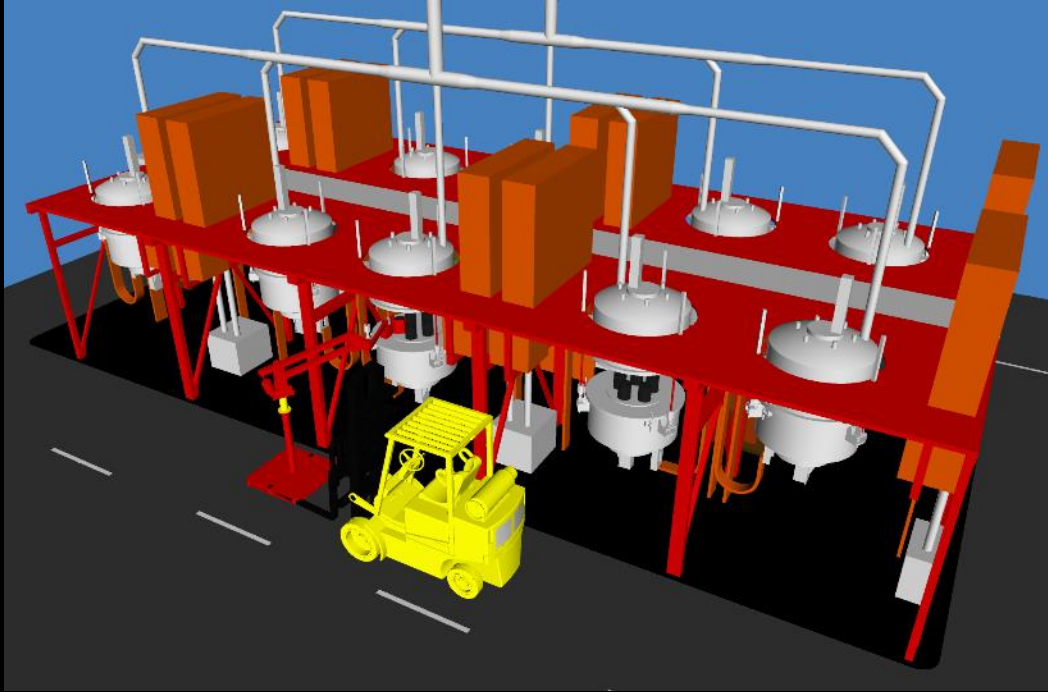


Alpha **SAPPHIRE**



Alpha **HPA**

ALPHA SAPPHIRE: UNIQUE SECTOR OPPORTUNITY



- **Technology Disruption:** Access to new Ebner-Fametec Technology
- **Supply Crunch:** End-user desire to de-link from Russia-China production
- **Demand Pull:** Major new demand from GaN-on-Sapphire semiconductors



Alpha **SAPPHIRE**



Alpha **HPA**

ORICA STRATEGIC INVESTMENT

2018

Aug-21

Nov-22

Nov-23

May-24

Commence
Technical
Diligence

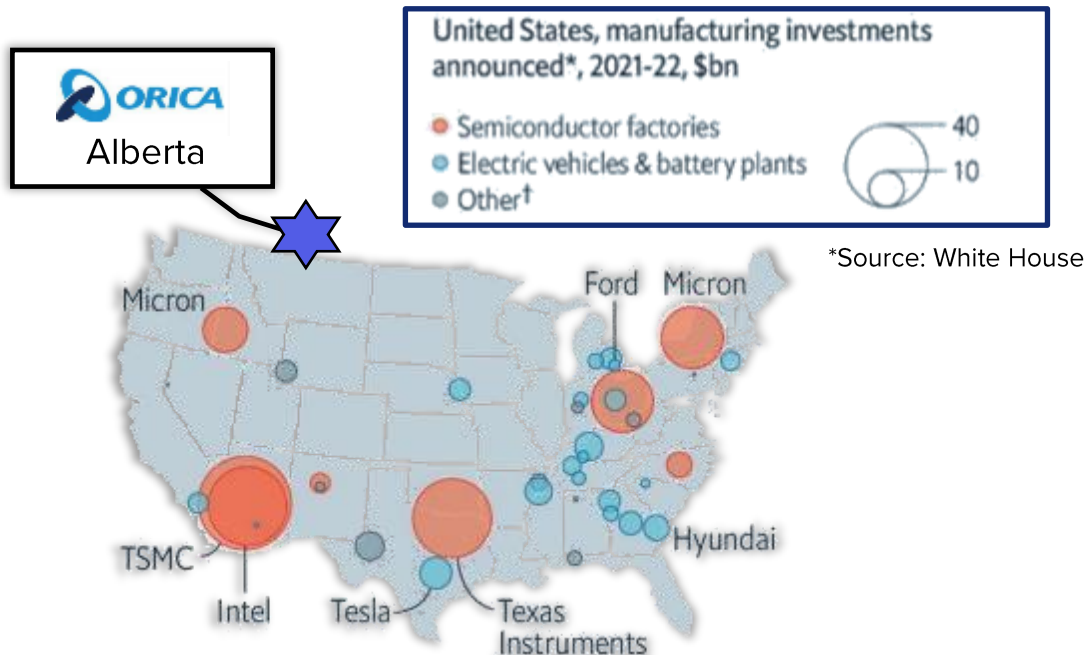
Definitive
Commercial
Agreements

5% Strategic
Investment &
North American
MoU

Supported
Alpha Sapphire
Raising A\$40M

Supported
FID Stage 2 Raising
A\$180M

NORTH AMERICA INVESTMENT LANDSCAPE



TECHNICAL AND COMMERCIAL VALIDATION VIA ORICA DUE DILIGENCE AND INVESTMENT



- ASX 100 Company Orica Ltd (ASX: ORI) acquired a 5% strategic interest in Alpha HPA in November 2022
- Orica and Alpha have worked together on the HPA First Project since 2018
- The investment builds upon binding arrangements to supply chemical reagents and offtake by-products at the HPA First Project, Gladstone
- Represents significant external endorsement of the capability, safety and operability of the process
- MoU signed to assess high purity aluminium products plant in North America (Alpha Polaris)

CORPORATE SNAPSHOT

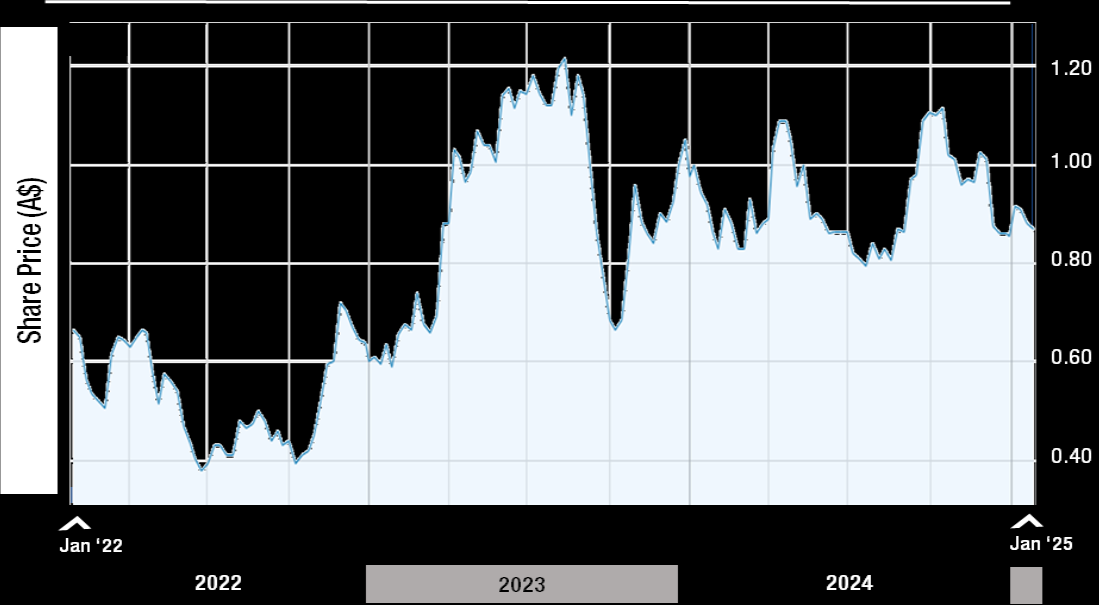
TRADING INFORMATION

ASX CODE	A4N
Share Price (29/01/2025)	~\$0.87c
52-week trading range	\$0.77 – \$1.18
Issued Shares	1,136M

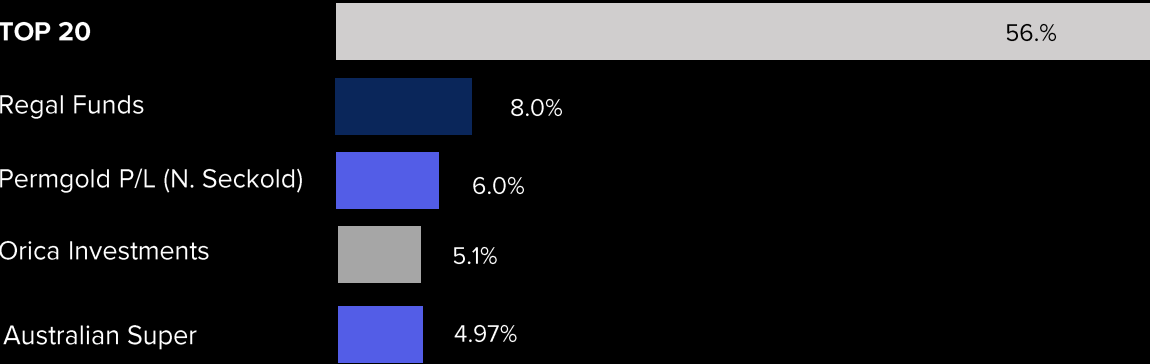
CAPITAL STRUCTURE

Issued Shares	1,136M
Unlisted options (@90c)	8.8M (expire 30 April 2025)
Unlisted options (@90c)	3M (expire 31 Aug 2025)
Performance Rights	10.12M
Market Cap	~\$980M
Est Cash (31/12/2024)	~\$149M
Enterprise Value	\$831M

SHARE PRICE PERFORMANCE – 3 YEARS



SHAREHOLDERS



Thank You

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