

Alpha HPA



HIGH PURITY ALUMINIUM MATERIALS FOR 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 – HIGH VALUE

Commercialising in 2 Stages as the

HPA FIRST PROJECT

STAGE 1 – IN PRODUCTION

STAGE 2 – IN CONSTRUCTION





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

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

HPA FIRST PROJECT: GLADSTONE QLD



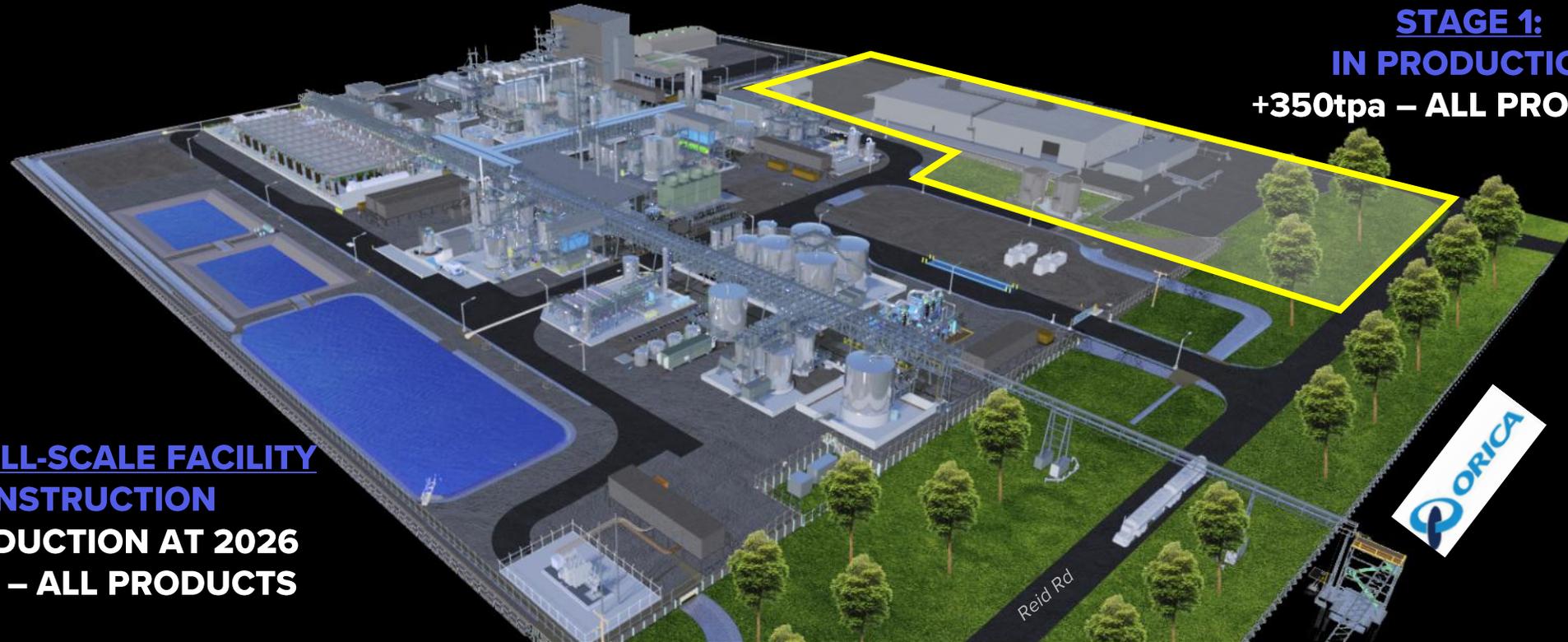
STAGE 1: IN PRODUCTION





STAGE 1: IN PRODUCTION

PROJECT LAYOUT:



STAGE 1:
IN PRODUCTION
+350tpa – ALL PRODUCTS



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

DFS CAPEX
\$553M

\$320M Loan facility
+
\$80M cost overrun facility
(NAIF + EFA)

\$175M Equity Capital
(May-June 2024)

\$21.7M
IPP Grant
(QLD Govt)

\$45M
MMI-C Grant
(Aust Govt)



RioTinto



Stage 1

Stage 2



Stage 2 Bulk Earthworks – December 2024

STAGE 2 : CONSTRUCTION UNDERWAY

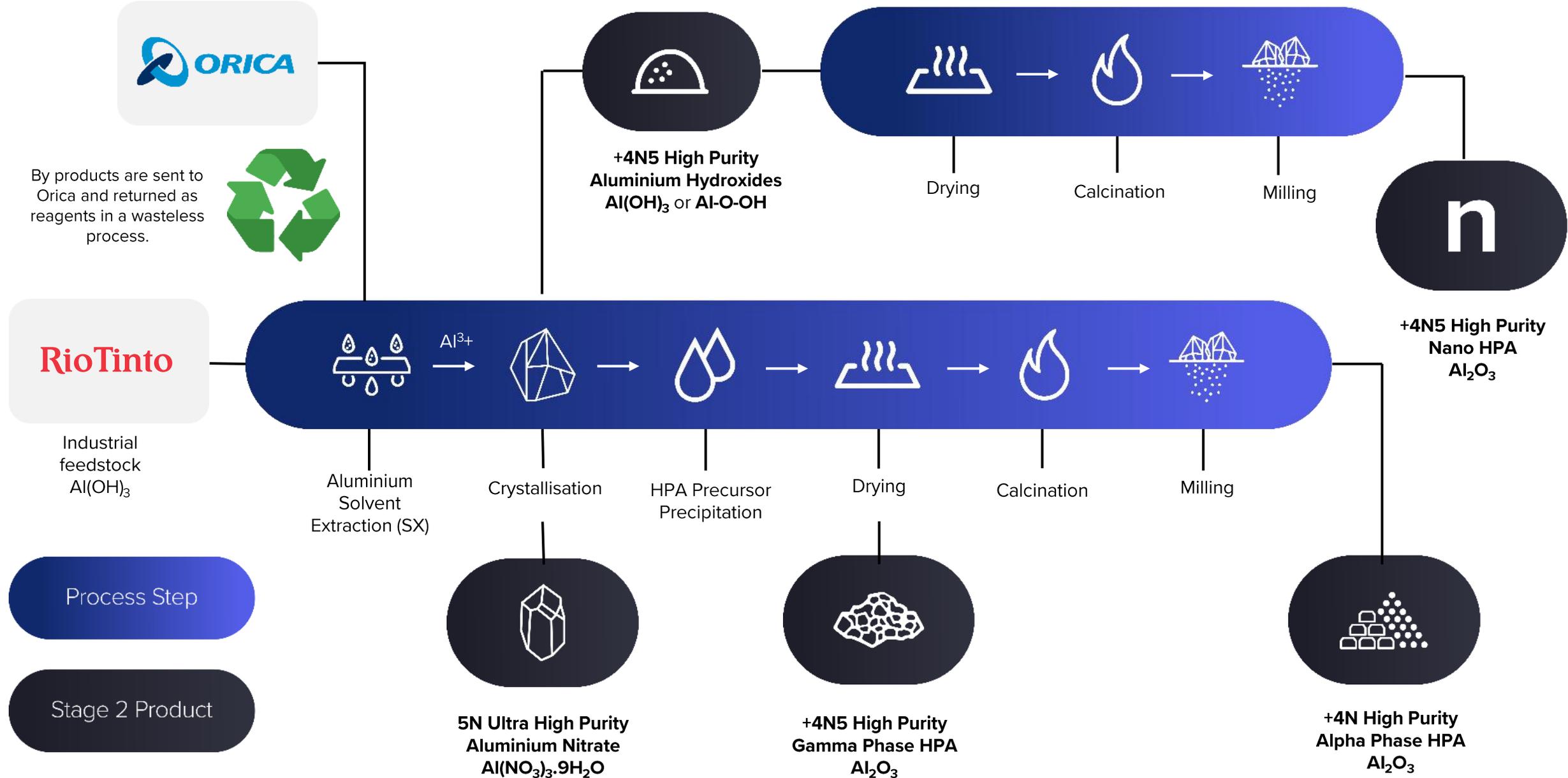




STAGE 2 : OFFSITE FABRICATION (SX)

HOW WE DO IT: OUR PROCESS AND TECHNOLOGY

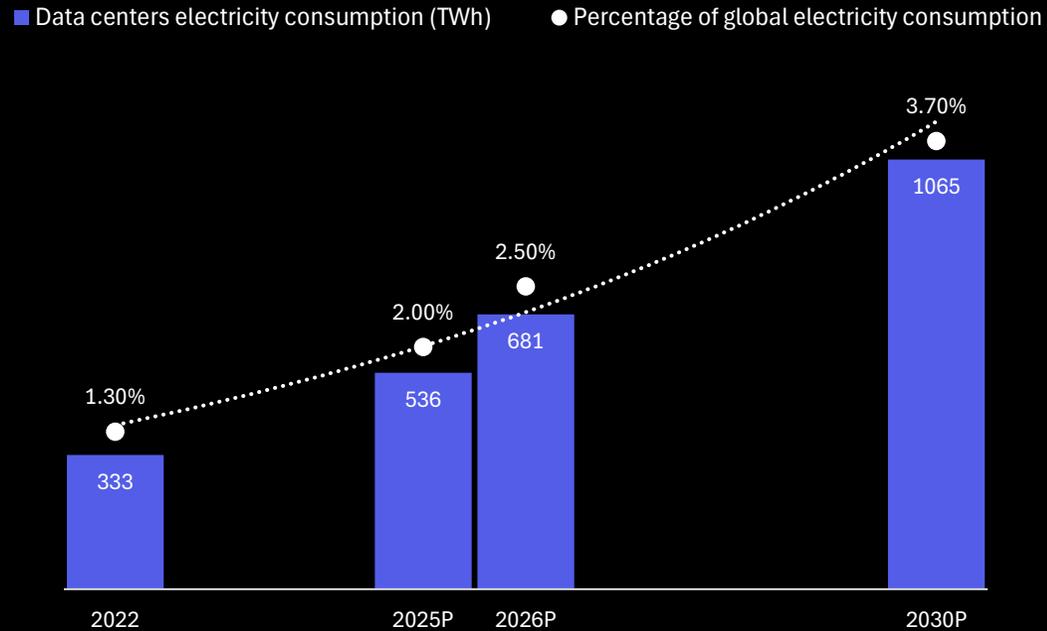
Novel, low energy, low-carbon process



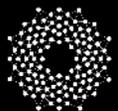
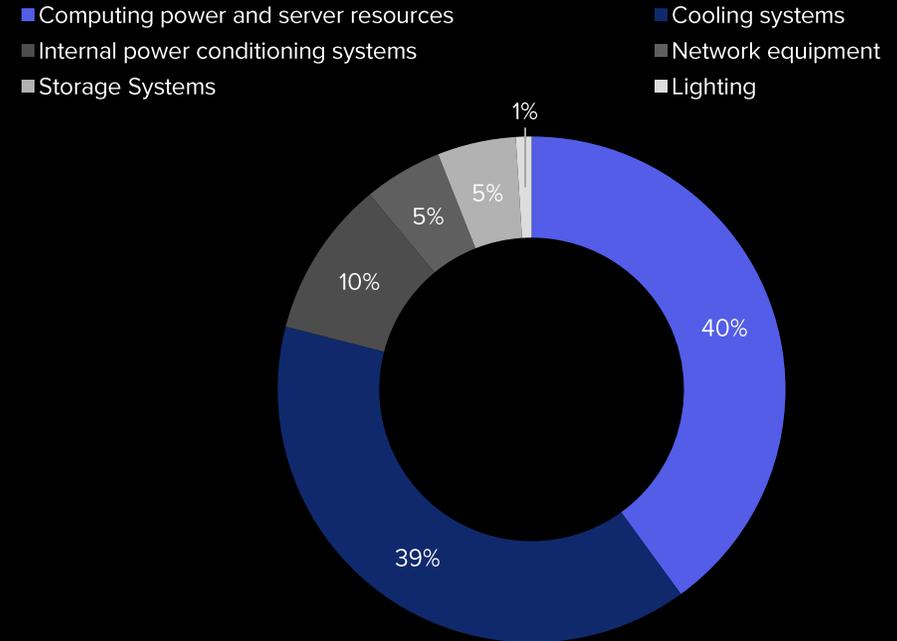
THERMAL MANAGEMENT FOR AI DATA CENTRES

- 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



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

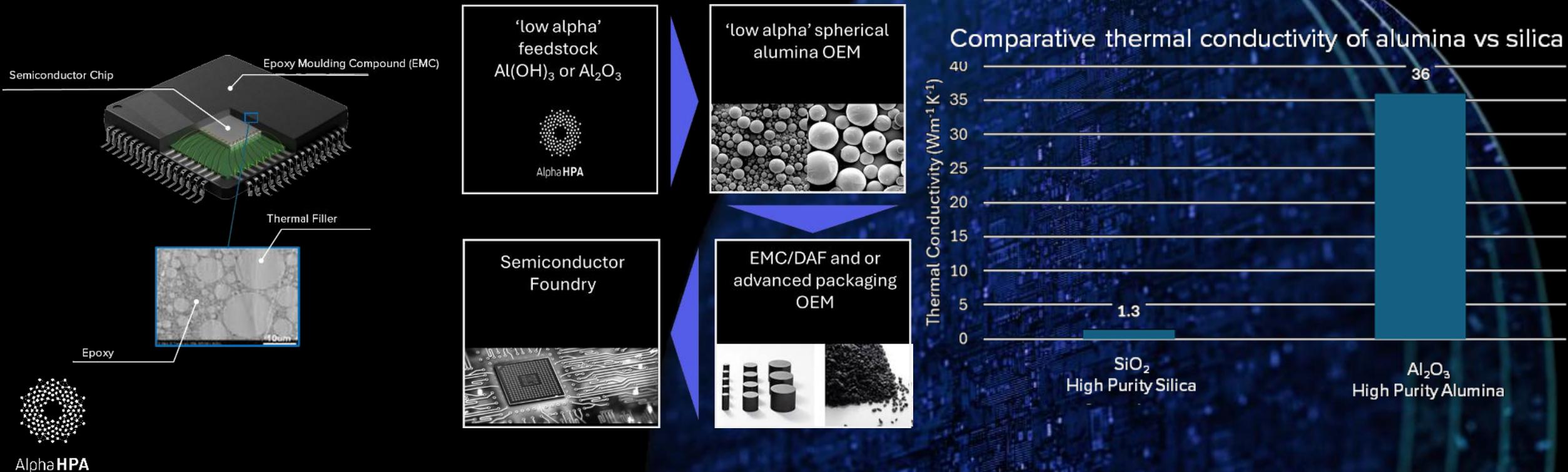


Source: Deloitte Analysis

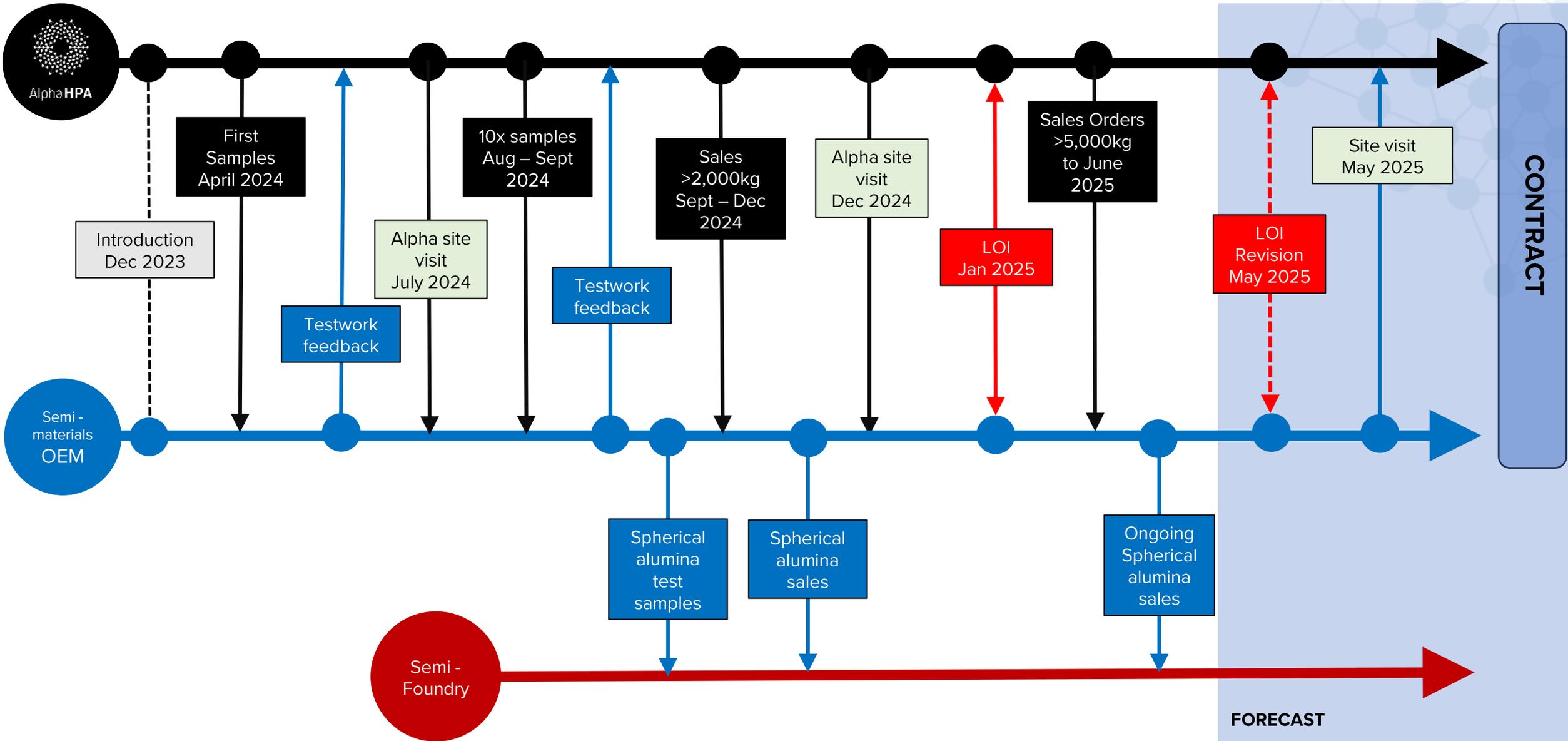
Source: Deloitte Analysis

SEMICONDUCTORS: THE RISE OF 'LOW-RADIATION' ALUMINA FILLERS

- *Thermal Filler* switching from high purity-silica to HPA for better thermal conductivity
- Alpha's technology produces non-detect levels of U and Th and therefore less soft errors on the chip
- Alpha Confirmed as best in class low-alpha radiation feedstock
- All new NE Asia end-users contacted seeking low-alpha feedstock
- Linear demand correlation between our material and parallel processing GPU's (AI)



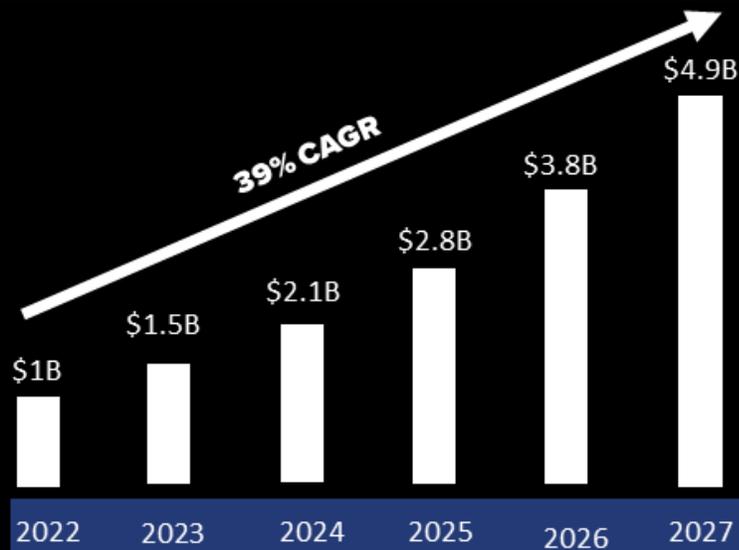
QUALIFICATION CASE STUDY: QUALITY LEADER IN 'LOW-ALPHA' ALUMINA FILLERS



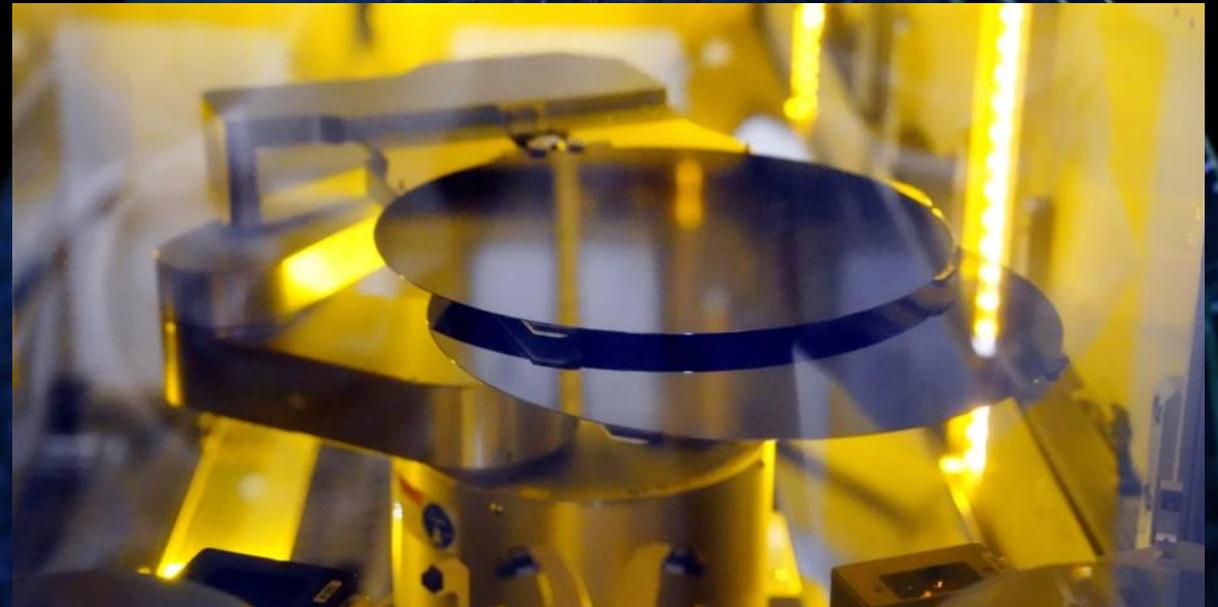
SEMICONDUCTORS: ALPHA HPA IN CMP POLISHING

- The rapid growth of power semi-conductors is leading to demand for HPA as the preferred CMP abrasive hard surface substrates, such as:
 - Silicon Carbide (SiC)
 - Gallium Nitride (GaN) and
 - Sapphire (Al_2O_3)
- The SiC semiconductor sector is rolling out next-generation CMP technology over next 5 years – driving new CMP slurry development
- Alpha has commenced small scale commercial sales to leading CMP end-users in the US and Asia and is in advanced qualification with end-users in Japan, China and the US including a recent Letter of Intent for up to 4,000 metric tpa

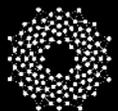
Value of SiC Semiconductors in EV's (US\$M)



Source: Wolfspeed Investor Day 2022 Presentation

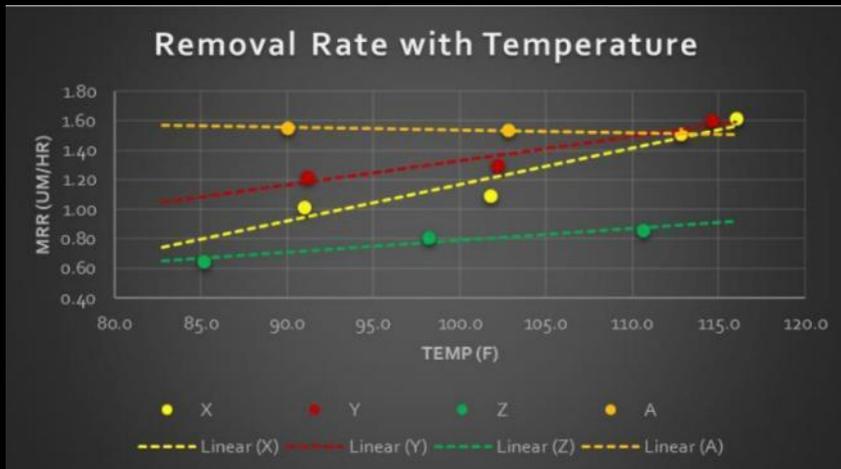


Polished Silicon-carbide (SiC) wafer substrates

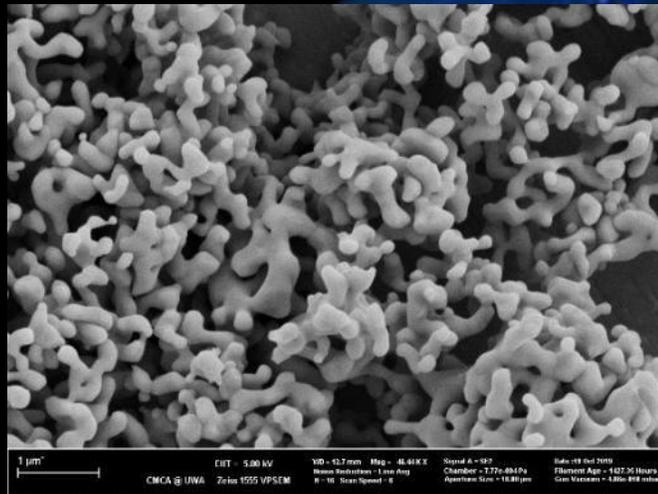


SEMICONDUCTORS: ALPHA HPA IN CMP POLISHING

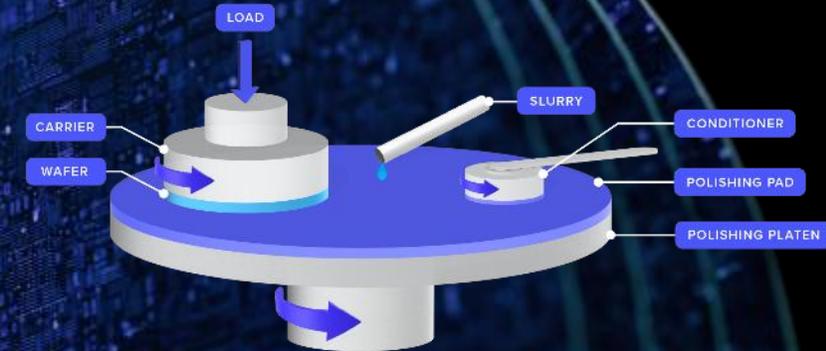
- Semiconductor substrates and stacked circuit layers are polished with a process referred to as *Chemical Mechanical Planarisation (CMP)*.
- Alpha's novel aluminas provide a +50% removal rate improvement in wafer polishing at lower operating temperatures
- Alpha's unique HPA crystal morphology and low levels of Na and K is delivering improved performance in CMP applications



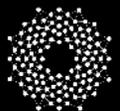
Alpha's HPA (Linear A) outperforms incumbents CMP slurries on SiC substrates. Source: Innovation Impact



Alpha's HPA 's novel 'vermicular' morphology Linked to CMP outperformance



CMP Process

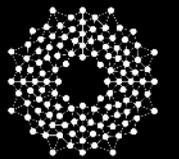
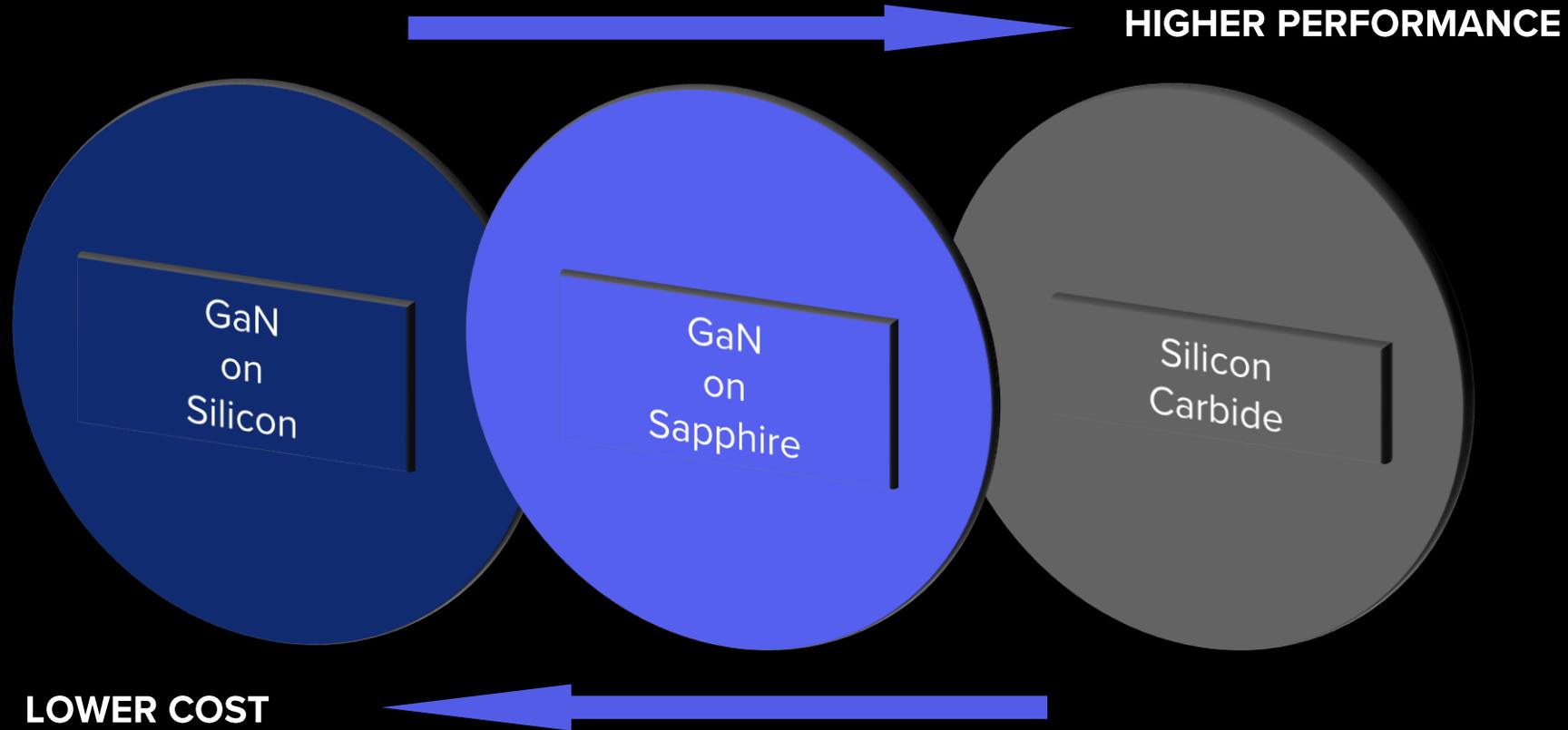


ALPHA SAPPHIRE: GaN ON SAPPHIRE POWER SEMIS

- Gallium-Nitride on sapphire (GaN-on-Sapphire) emerging as an alternative platform for power-semiconductors
- Ga-N on sapphire represents a 'mid-point' between higher cost SiC and lower performance GaN-on-Silicon
- Applications include fast chargers, high voltage switching and automotive power systems



Alpha **SAPHIRE**



Alpha **HPA**

ALPHA SAPPHIRE: GaN ON SAPPHIRE POWER SEMIS

- GaN-on-Sapphire requires wide-format (8"), C-plane wafers
- Ideally suited to Alpha's investment in next generation growth technology



Alpha **SAPPHIRE**



Alpha HPA Ultra Pucks



Alpha's Sapphire Growers

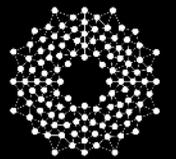


Complete C-Axis Sapphire Boule



Sapphire Wafer

- Qualification Underway: "8" sapphire wafers being delivered to global tier #1 OEM
- Specifications agreed with 2 x additional OEM's



Alpha **HPA**

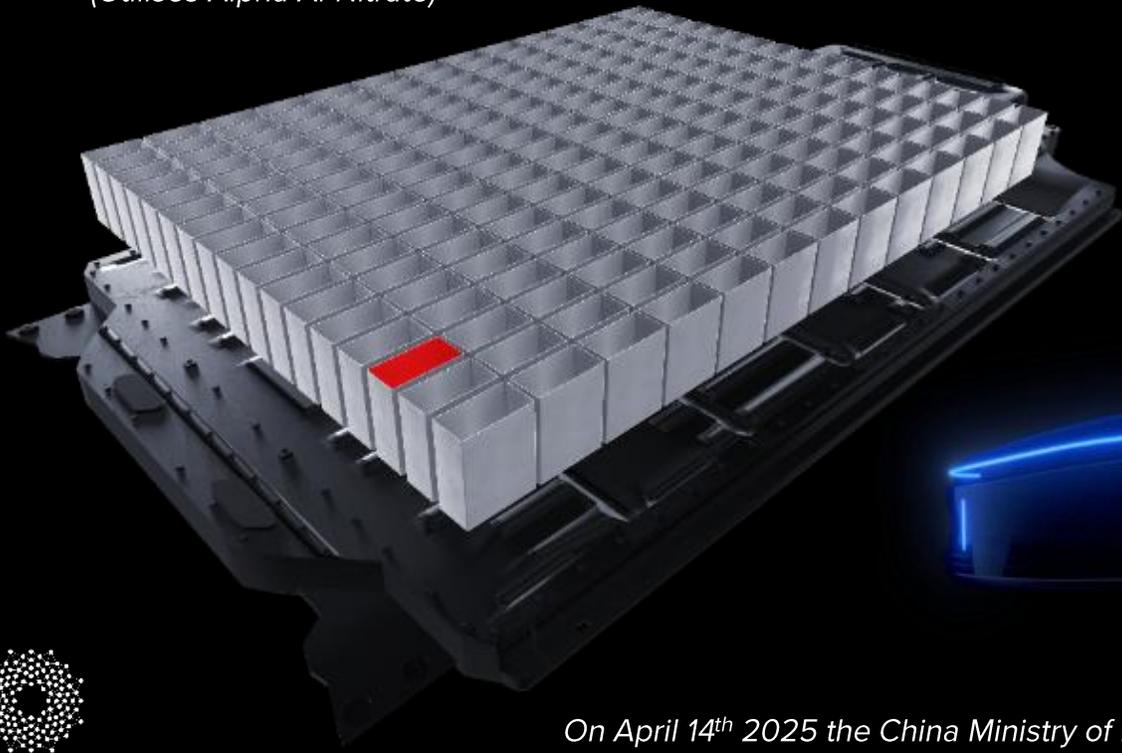
WE MAKE BATTERIES SAFER

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

Technical APPROVAL from a GLOBAL Li-B anode OEM after 18months test work

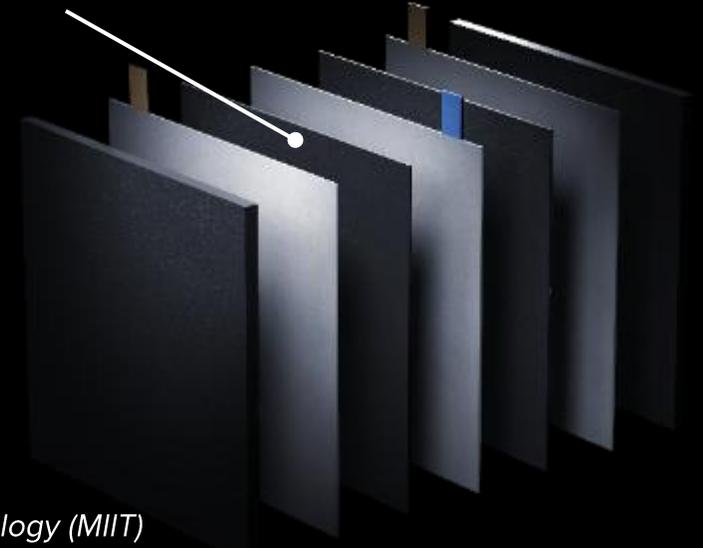
CELL COATING - *Alpha UltraCoat*

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

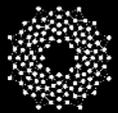


ANODE COATING

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



On April 14th 2025 the China Ministry of Industry and Information Technology (MIIT) introduced a rigorous new set of technical standards for the batteries in electric vehicles



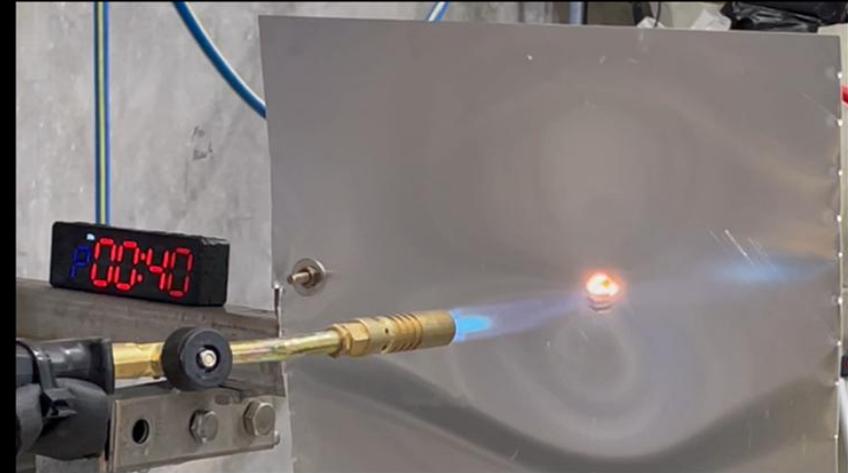
BATTERY CELL CASE COATINGS



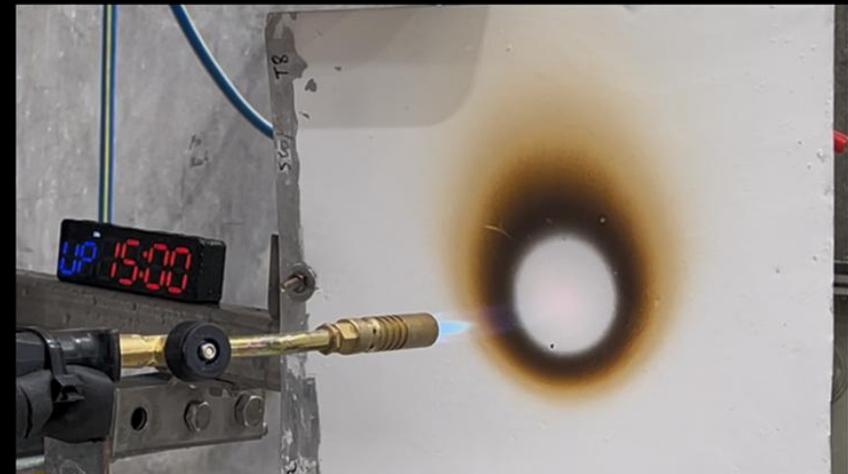
- Alpha *UltraCoat* – Test work underway with Global Automotive OEM
- Independent modeling* shows neutral cost impact for *UltraCoat* adoption

* Modeling by P3 Group, Germany. Cost impact modeled at US\$/kWh at cell pack level

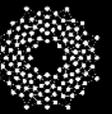
Alpha *UltraCoat* - thermal runaway propagation control
Coated vs Uncoated cell casings



UNCOATED ALUMINIUM CELL CASE (0.5MM)
40 seconds under butane flame (+1,500°C)



ULTRACOATED (0.3MM) ALUMINIUM CELL CASE
Cell case integrity intact after 15 minutes burn test

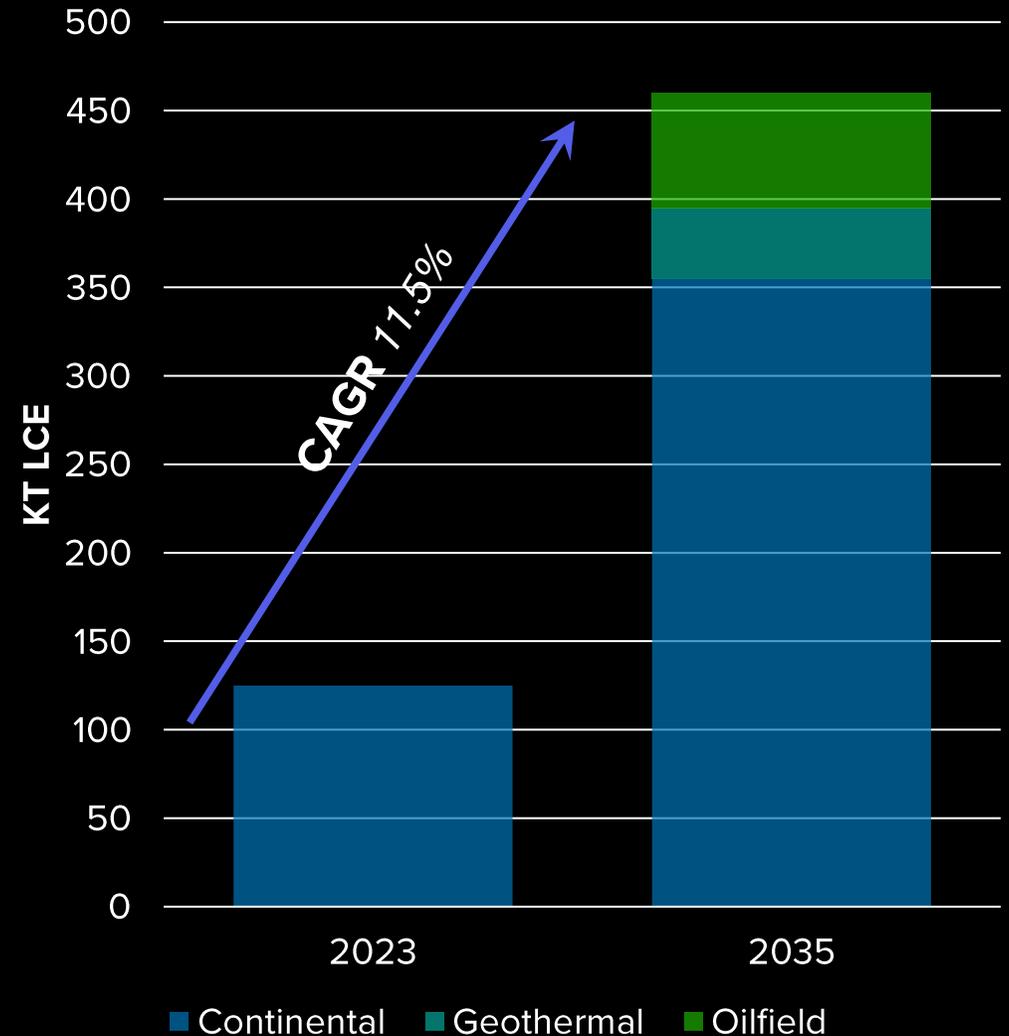


WE MAKE BETTER PERFORMING DLE SORBENTS

STRONG NEW DEMAND FOR DIRECT LITHIUM EXTRACTION (DLE) SORBENTS

- DLE sorbents increasingly made from high-purity alumina-hydrate ($\text{Al}(\text{OH})_3$ or 'ATH')
- Test-work and commercial demand growing rapidly with entry of Petroleum majors
- Now expanded to over 14 counterparties
- Alpha's unique ability to manufacture high purity ATH as 100% amorphous gives **best-in-class sorbent performance**
 - **>1.5x longer lifespan**
 - **Up to 2x higher extraction rates**

LITHIUM CARBONATE EQUIVALENT (LCE) GROWTH FROM DIRECT LITHIUM EXTRACTION (DLE)



Source: Benchmark Minerals



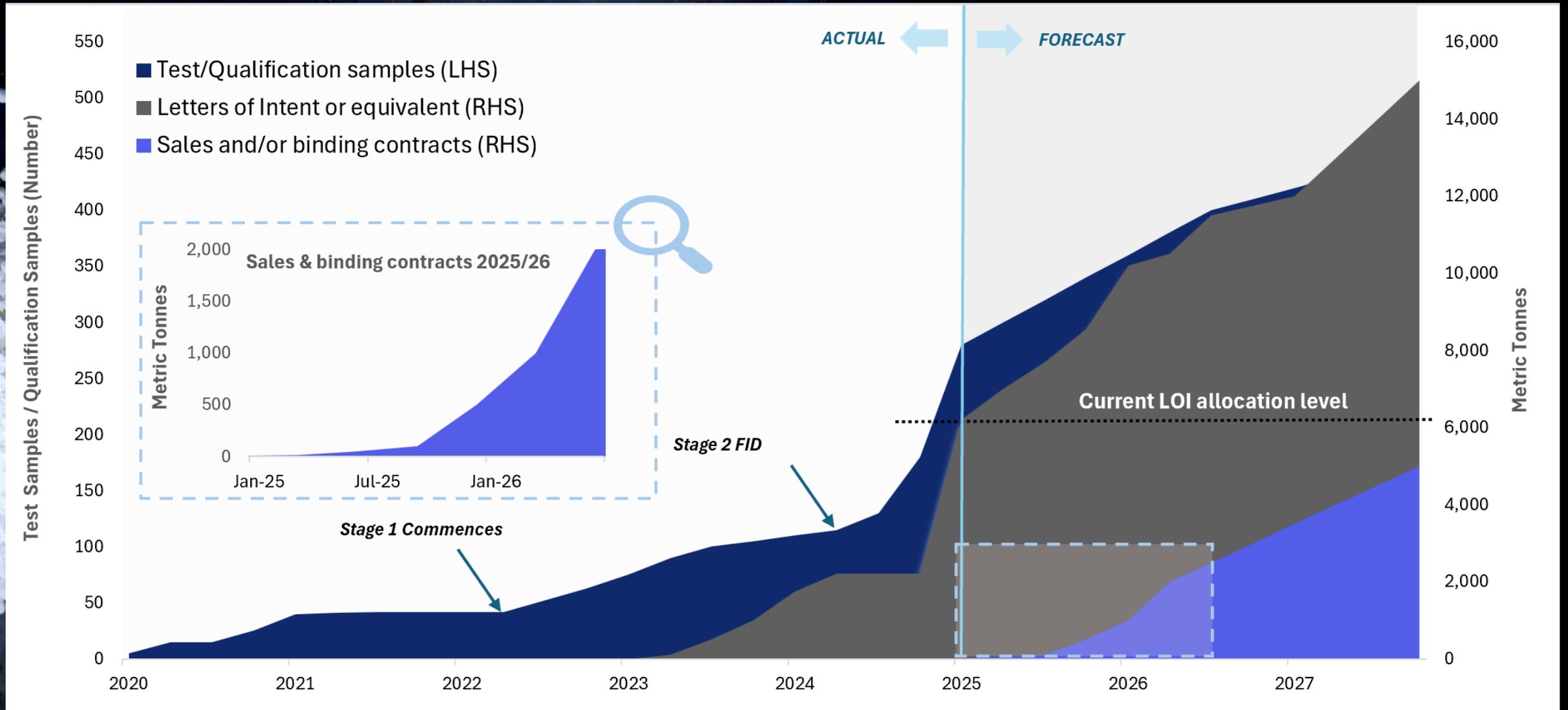


Alpha HPA

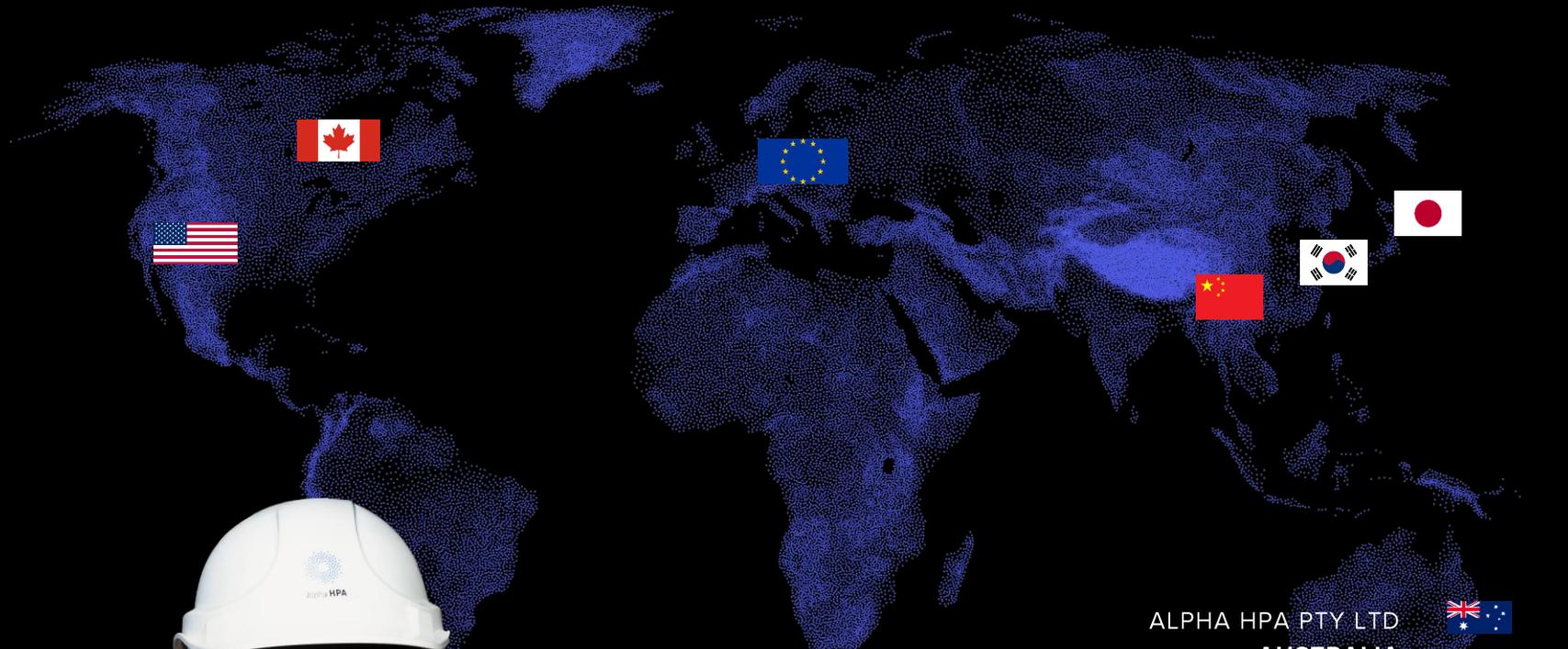
WHERE ALPHA HOLDS A CLEAR TECHNICAL ADVANTAGE

SECTOR	SEMICONDUCTOR		DLE	LITHIUM-ION BATTERY
USE	THERMAL FILLERS	CMP	DLE SORBENTS	COATINGS
PRODUCTS	Alumina and ATH materials as spherical 'heat sinks' to manage temperature in high performance parallel processors	Alumina abrasives for polishing silicon carbide substrates (Si-C) and package polishing	ATH (Al(OH) ₃) as a precursor to make DLE sorbents for extracting lithium from brines	High purity Al-Nitrate as coating precursor to apply Al-based coating on anode materials
A4N ADVANTAGE	End-users have noted Alpha is the only global supplier capable of providing <1ppb U and Th materials for 'low-alpha' thermal interface fillers	Novel process delivers ultra low alkali metals impurities (Na & K) and morphology driving out-performance as a CMP abrasive	Novel process delivers unique amorphous ATH crystal structure = ULTRA-HIGH PERFORMANCE	Alpha HPA is the first company globally to manufacture 5N purity aluminum nitrate MAJOR SAFETY BENEFIT
ALLOCATION	1,100tpa under LOI (2 OEM's) 2 x LOI's in draft Qualifying with 6 x other Premium pricing ~ US\$25 – 35/kg Est. unmet demand: +5ktpa	4,000tpa under LOI Small scale sales commenced Qualifying for 10 x other Strong pricing ~US\$20-30/kg Est. unmet demand: 10kt	LOI in draft Qualifying with 14 x counterparties Moderate pricing Est unmet demand: +25ktpa	Qualified with a sector leader 2 x LOI + quotation in draft Moderate pricing (strong in HPA Eq) Est unmet demand: +10ktpa

PRODUCT MARKETING PROGRESSION



Alpha's product marketing has matured, focusing on applications where our process can deliver technical performance that other suppliers cannot



SALES AGENTS & INTERMEDIARIES

-  **AUSTMIN CHINA**
-  **APL MATERIALS JAPAN**
-  **AM&M NORTH EAST ASIA**
-  **TECHNOLOGICA EU**
-  **PENLAN CHEMICALS CANADA**
-  **PENLAN CHEMICALS AMERICA**



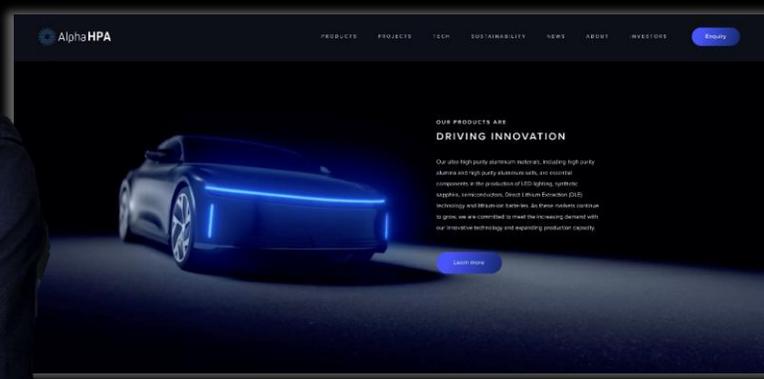
DIGITAL MARKETING TEAM

-  • WEBSITE ORDERS
- SEO & SOCIAL MEDIA

ALPHA HPA PTY LTD
AUSTRALIA 

SECTOR ADVISORY & INTERMEDIARIES

- | | |
|--------------------------------|--------------------------------|
| SEMICONDUCTOR & LED | EV & LI-ION BATTERY |
| • ARKESSE LLC | • ALTO GROUP |
| • YOLE | • ELECTRIOS |
| | • P3 GROUP |



GLOBAL MARKETING STRATEGY

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**

USA

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

Demand +15,000tpa
Counterparties: +25



EU

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

Demand +15,000tpa
Counterparties: +20

Japan

- Semiconductor
- Li-ion battery
- Specialty Ceramics

Demand +2,000tpa
Counterparties: +10



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



South Korea

- Semiconductor
- Li-ion battery

Demand +2000tpa
Counterparties: +6



China

- Li-ion battery
- Semiconductor
- DLE

Demand +10,000tpa
Counterparties: 4

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.

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

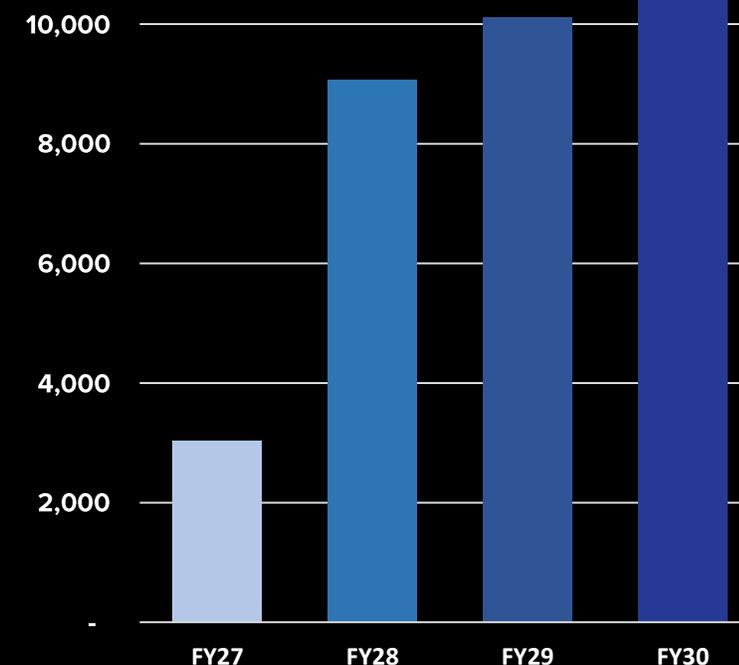
~71% - 79%

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.

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

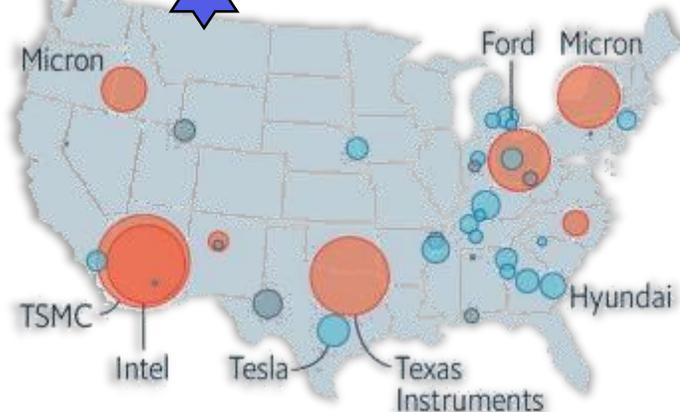


United States, manufacturing investments announced*, 2021-22, \$bn

- Semiconductor factories
- Electric vehicles & battery plants
- Other†



*Source: White House



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); Concept study commenced.

CORPORATE SNAPSHOT

TRADING INFORMATION

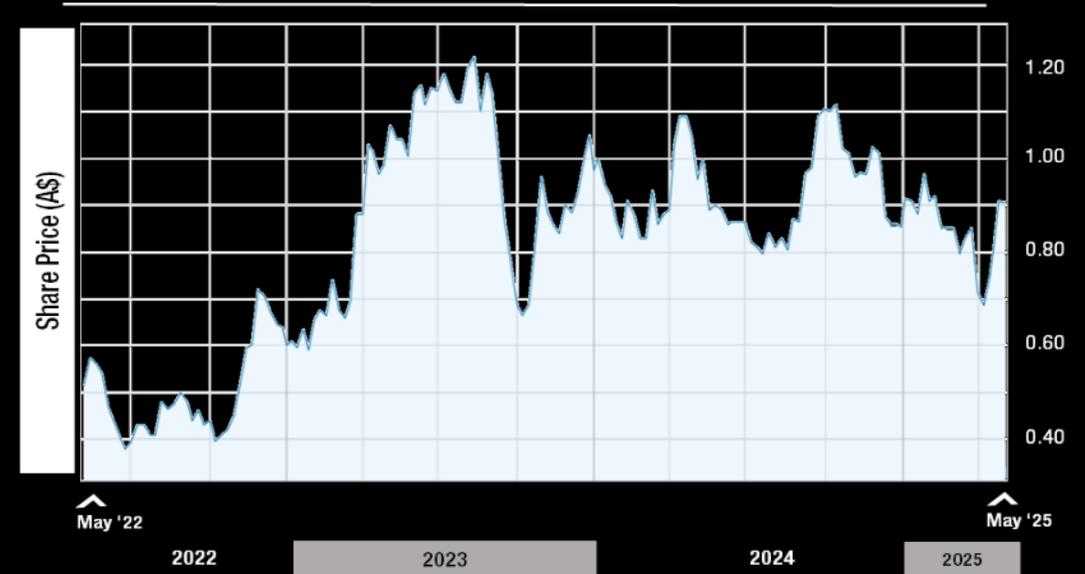
ASX CODE	A4N
Share Price (05/05/2025)	~\$0.91c
52-week trading range	\$0.77 – \$1.18
Issued Shares	1,136M

CAPITAL STRUCTURE

Issued Shares	1,136M
Unlisted options (@90c)	3M (expire 31 Aug 2025)
Performance Rights	9.77M

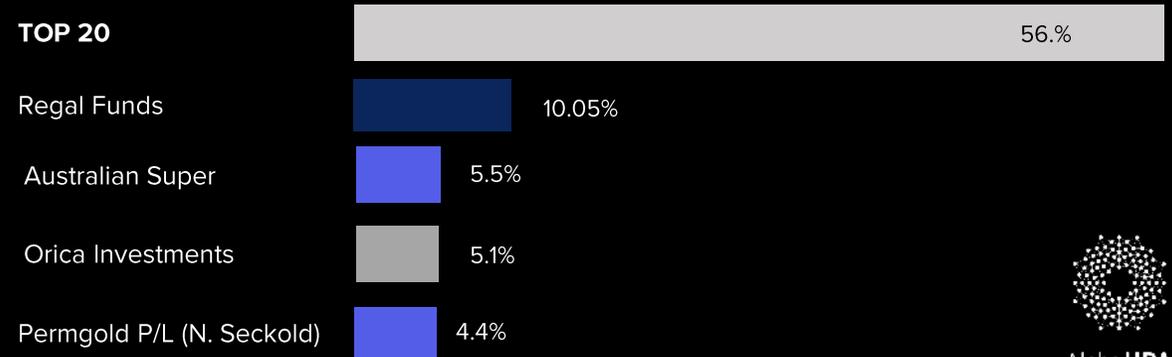
Market Cap	~\$1B
Est Cash (31/03/2025)	~\$120M
Enterprise Value	\$880M

SHARE PRICE PERFORMANCE – 3 YEARS



SHAREHOLDERS

TOP 20



THANK YOU

Rob Williamson

Managing Director

rwilliamson@alphahpa.com.au

+61 408 414 474

Rimas Kairaitis

Executive Director and Chief Commercial Officer

rkairaitis@alphahpa.com.au

+61 407 125 176

Robert Lord

Investor Relations

rlord@alphahpa.com.au

+61 400 008 553

alphahpa.com.au

