

Alpha **HPA**

ALPHA HPA LTD (ASX: A4N)

HPA FIRST PROJECT

**INNOVATIVE HIGH PURITY ALUMINA (HPA) PRODUCTION TECHNOLOGY FOR
THE BURGEONING ELECTRIC VEHICLE (EV) BATTERY MARKETS**

JUNE 2019

Forward Looking and Cautionary Statements



Alpha **HPA**

Cautionary Statement

The Pre-Feasibility Study (PFS) referred to in this announcement has been undertaken to assess the technical and financial viability of the HPA First Project. Further evaluation work including a Definitive Feasibility Study (DFS) is required before the Company will be in a position to provide any assurance of an economic development case. The PFS is based on the material assumptions described in the body of this report and summarised in the Summary of Material Assumptions and Summary of Modifying Factors in **Appendix 5**. These include 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 range of outcomes indicated by this PFS will be achieved. To achieve the range of outcomes indicated in the PFS, Pre-Production Capital funding in the order of A\$215 million plus working capital will likely 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 Project. If it does, this could materially reduce the Company's proportionate ownership of the Project. Given the uncertainties involved, investors should not make any investment decisions based solely on the results of the PFS.

Forward Looking Statements

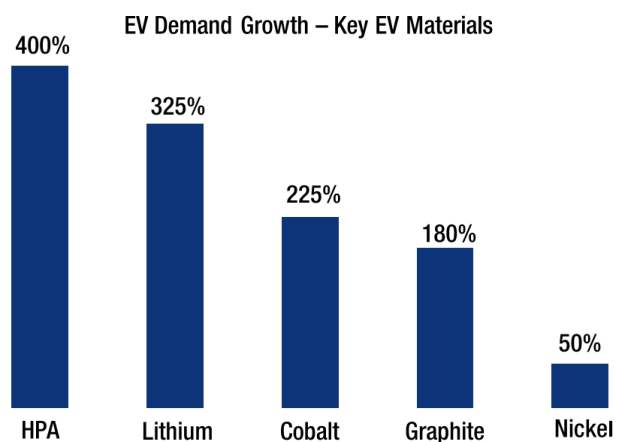
This PFS contains certain forward-looking statements with respect to the financial condition, results of operations, and business of the Company and certain plans and objectives of the management of the Company. These forward-looking statements involve known and unknown risks, uncertainties and other 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, gives 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 PFS in light of those disclosures.

Global Transportation is Electrifying



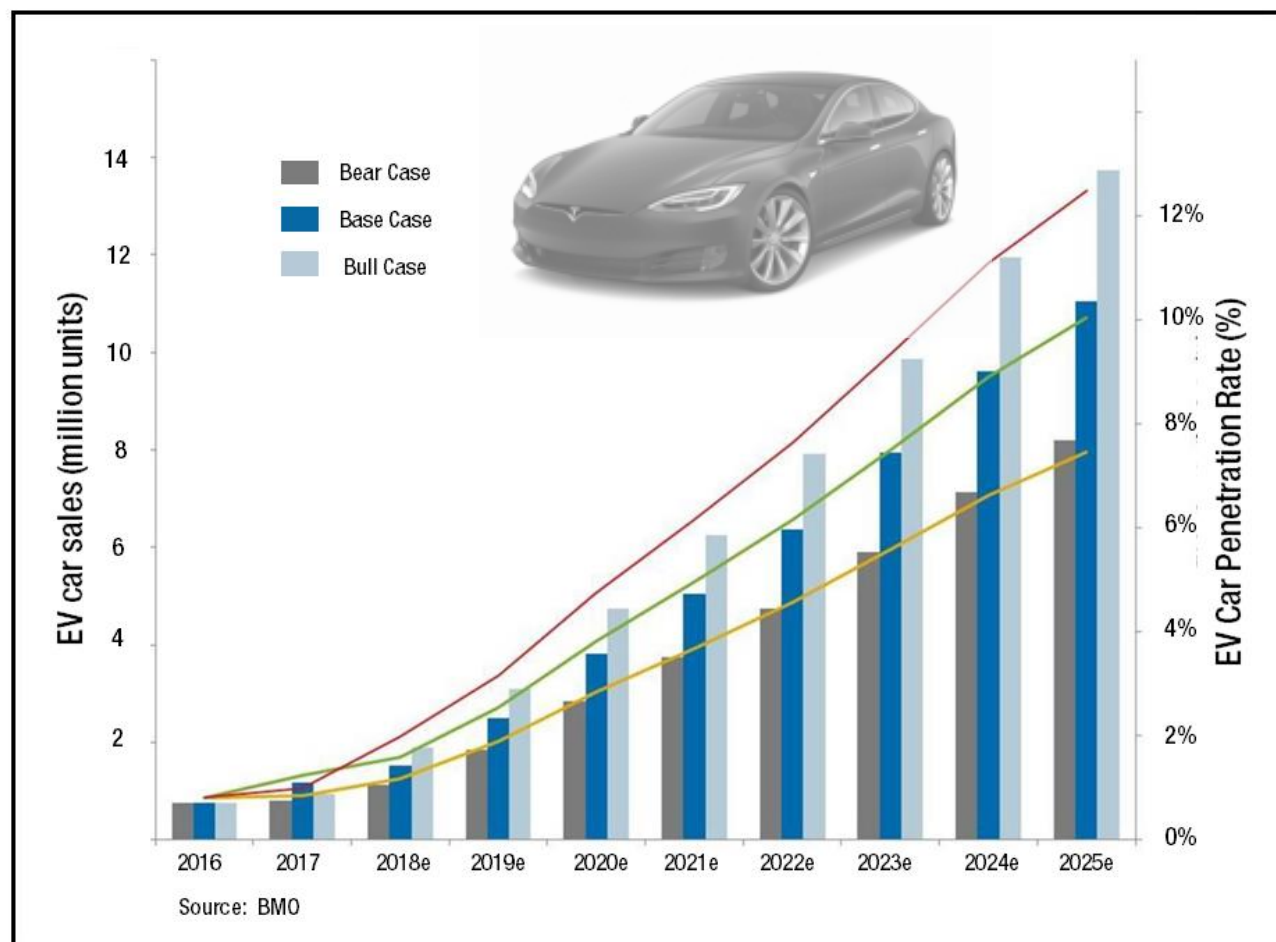
Alpha HPA

- The Electric Vehicle (EV) revolution has arrived, underpinned by Government mandated EV targets, led by China and Europe
- 70 lithium ion battery mega-factories under construction across four continents to meet EV demand
- Attendant demand for battery materials, lithium, graphite, cobalt, nickel and **High Purity Alumina (HPA)**

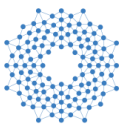


Source: Various Industry Sources & Research

Dramatic EV penetration rates – driven by Govt Regulation

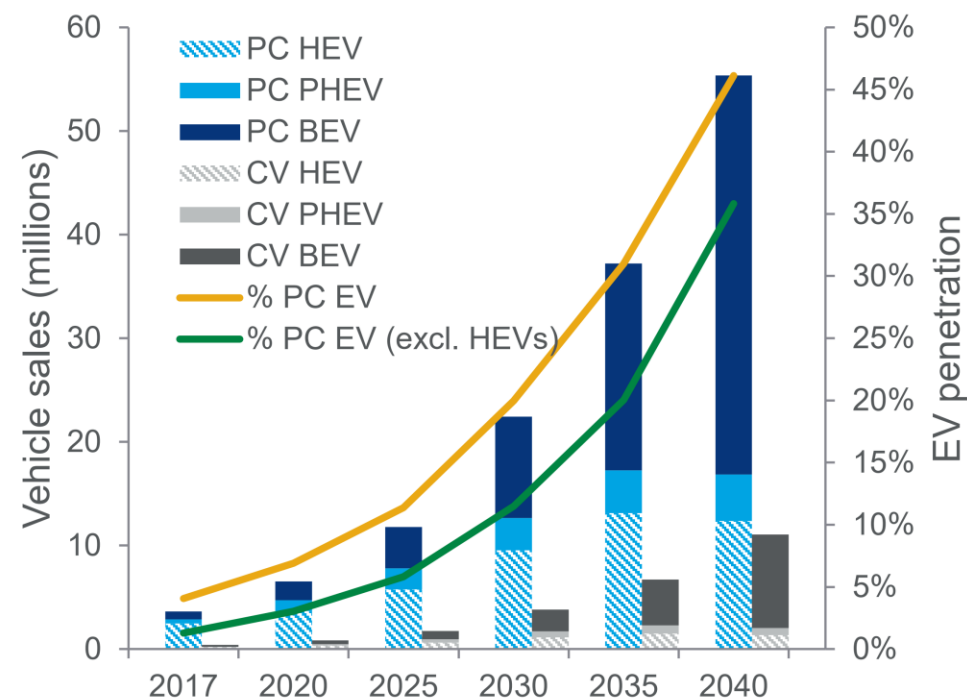


Global Transportation is Electrifying

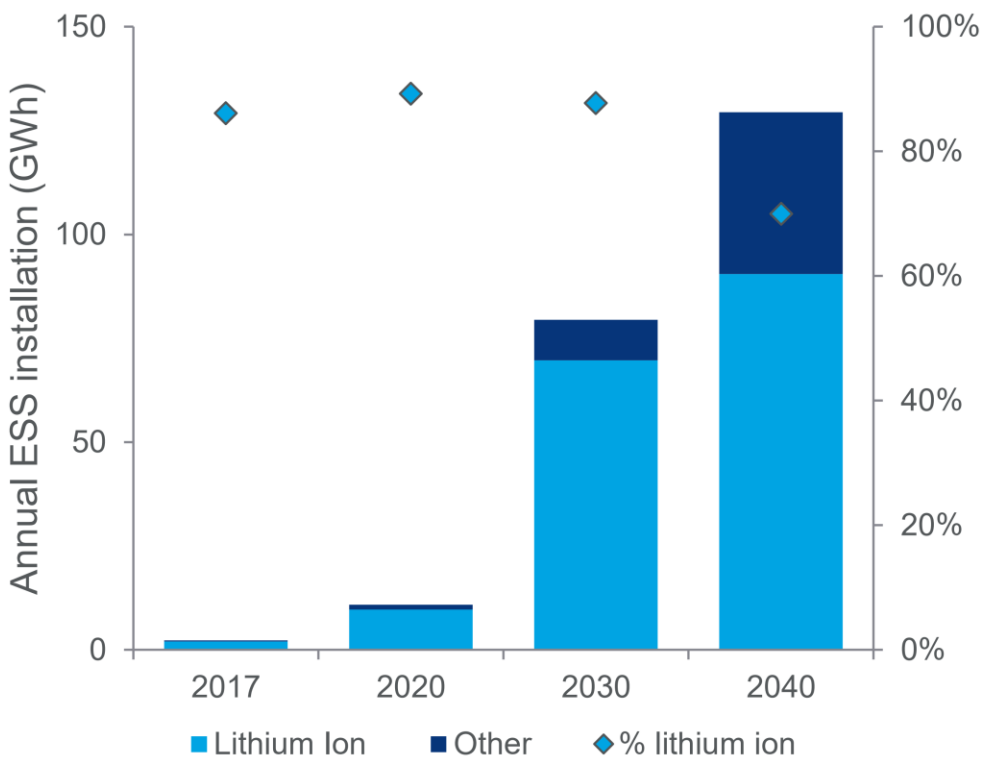


Alpha HPA

Passenger car (PC) and commercial vehicle (CV)
EV sales forecast



Global ESS installations (GWh)



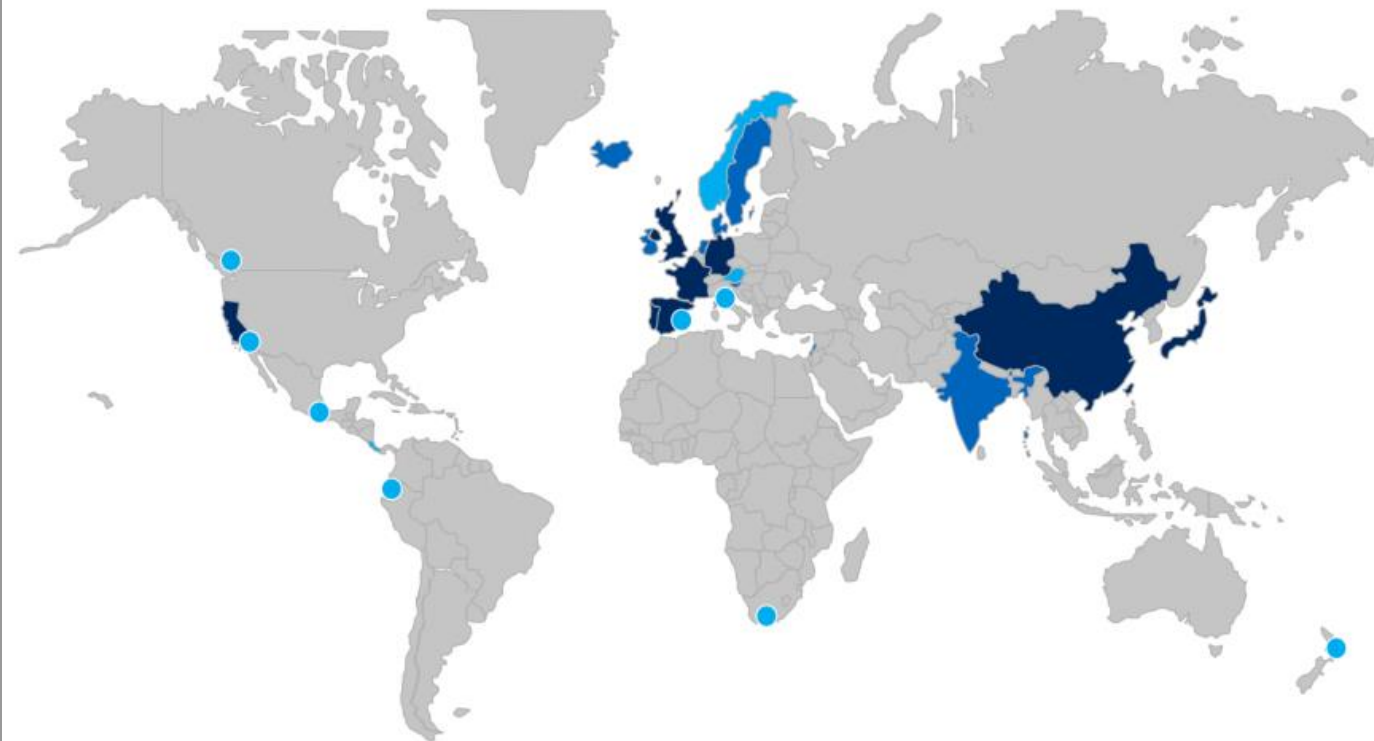
ESS = Energy Storage Systems
Source: Wood Mackenzie

Global Transportation is Electrifying



Alpha HPA

End dates for ICEs around the world



ICE sales ban starting from 2020s

2020 2021 2025

ICE sales ban starting from 2030s

2030¹ 2030 2030
 2030 2030 2030
 2030 2030

ICE sales ban starting from 2040s

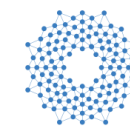
2040 2040² 2040
 2040 2040 2050
 2040 2040² 2050

Ban of ICE vehicles from "large parts" of city by 2030 (Auckland, Barcelona, Cape Town, Los Angeles, Mexico City, Milan, Quito, Vancouver)

Source: McInsey

- Alpha HPA has already initiated HPA marketing into the key battery markets of China, South Korea and Germany

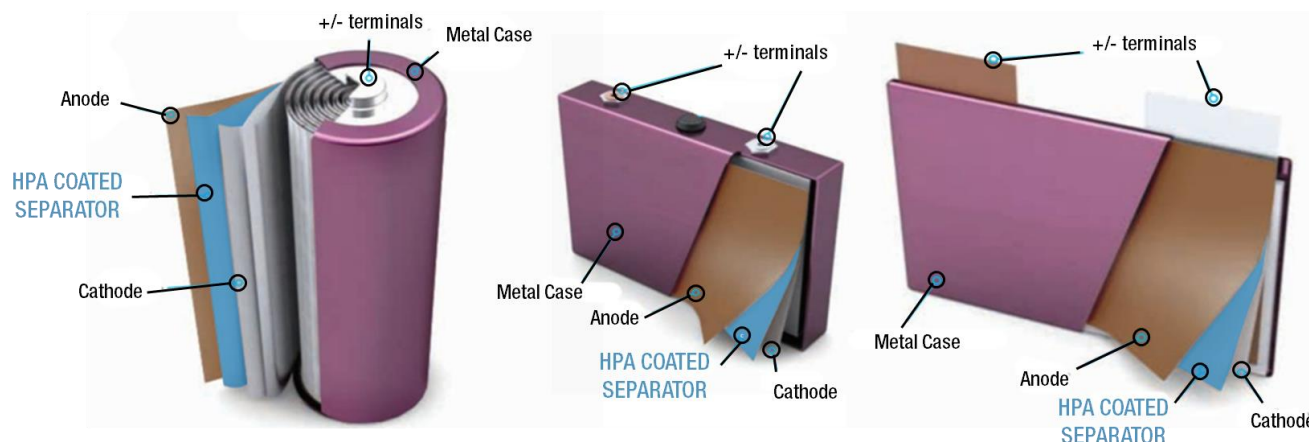
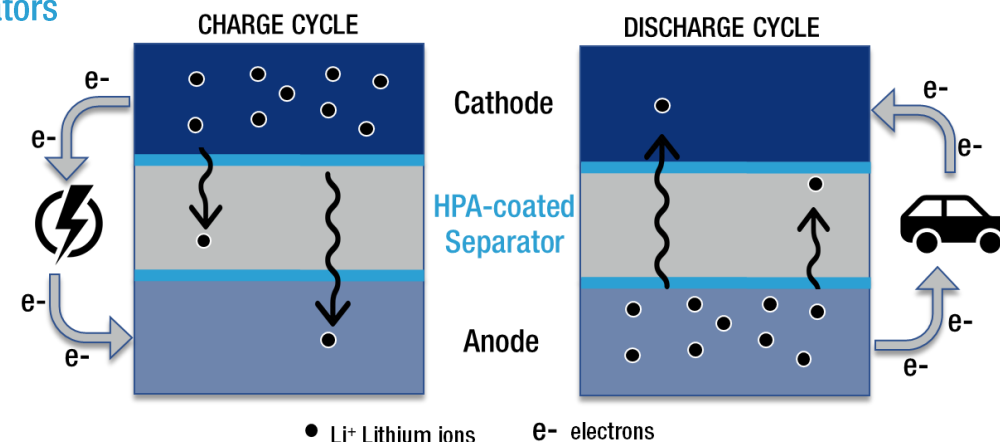
HPA – A critical part of the EV/battery revolution



Alpha HPA

- High Purity Alumina (HPA) is the pure form of aluminium oxide (Al_2O_3). HPA is a pre-cursor material for the manufacture of **ceramic coated Lithium-Ion-Battery (Li-B) separators**
- Ceramic coated separators are a key safety and performance element for the high-temperature EV batteries
- Ceramic (HPA) coating provides thermal stability whilst allowing ionic exchange
- Ceramic (HPA) coating of electrodes now a key Li-B trend
- Purity a critical requirement to prevent battery ageing

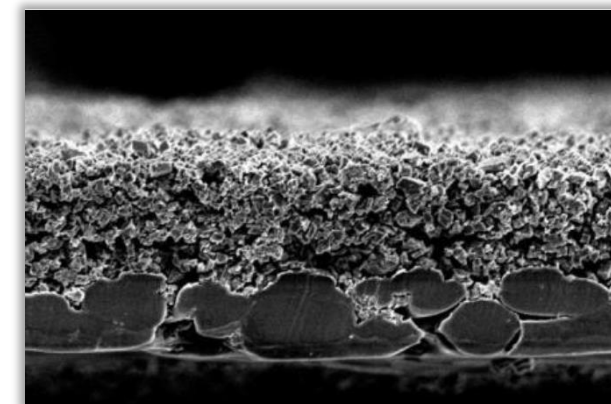
LITHIUM-ION BATTERY SEPARATORS



Ceramic (HPA)
Coating



Separator
(usually Polyolefin)

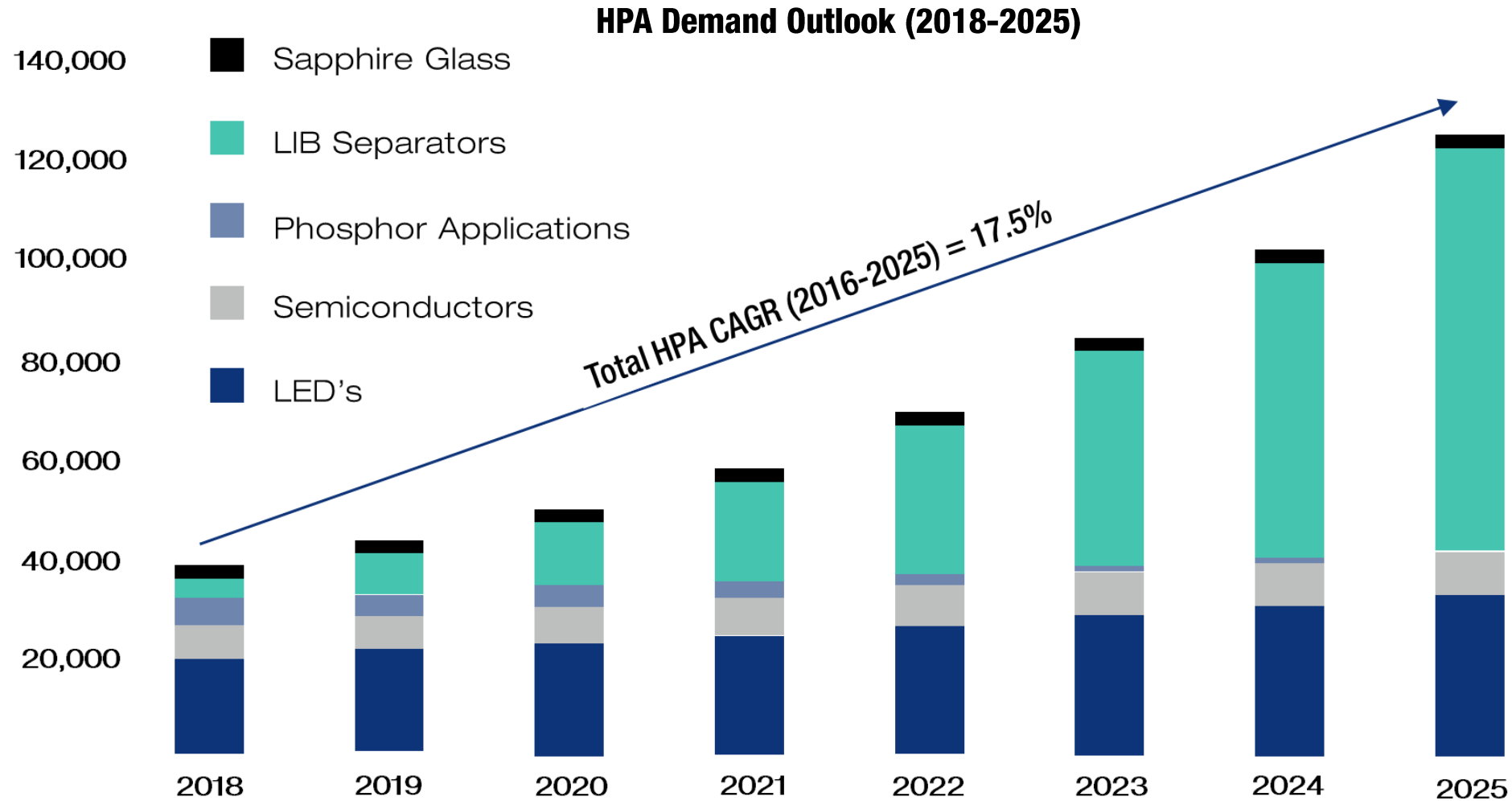


SEM Image – Ceramic Coated Separator

HPA Demand 1:1 linked with the Battery Boom



Alpha HPA



Source: CRU

High Purity Alumina (HPA) – Price for Purity



Alpha HPA



- HPA's value derives from its physical properties of extreme hardness, high thermal conductivity, and being chemically inert
- Purity is determined by the concentration of trace elements in the alumina compound e.g. iron, magnesium, sodium
- Price and performance of HPA varies upon product density, crystal structure, particle size and distribution and degree of purity

PRICE FOR PURITY

SGA	99.5% purity	~US\$400/t
3N HPA	99.9% purity	~US\$5,000-15,000/t
4N HPA	99.99% purity	~US\$15,000-30,000/t
5N HPA	99.999% purity	~US\$30,000-50,000/t
6N HPA	99.9999% purity	By negotiation in a very limited market.

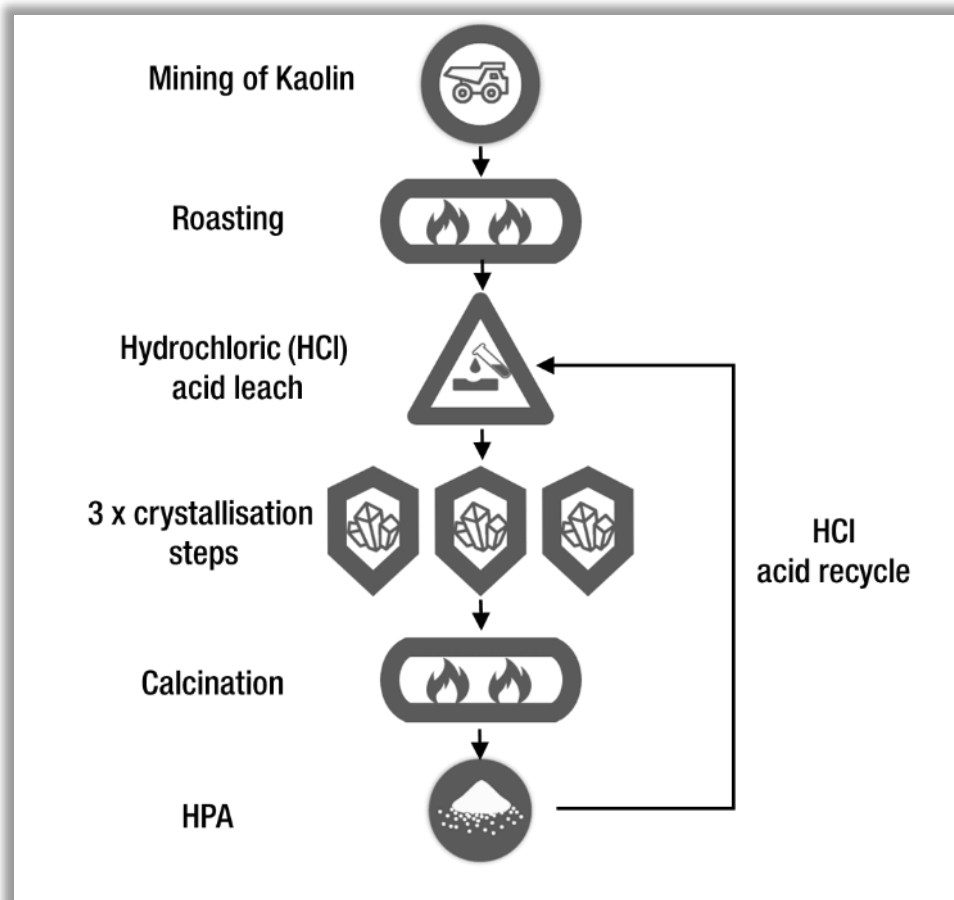
4N HPA is the largest sector of the HPA market and is seen by Alpha HPA as the most logical sector of the market in which to focus in terms of demand volumes and margin optimisation

Source: CRU and Alpha HPA

Existing HPA Market Production Processes

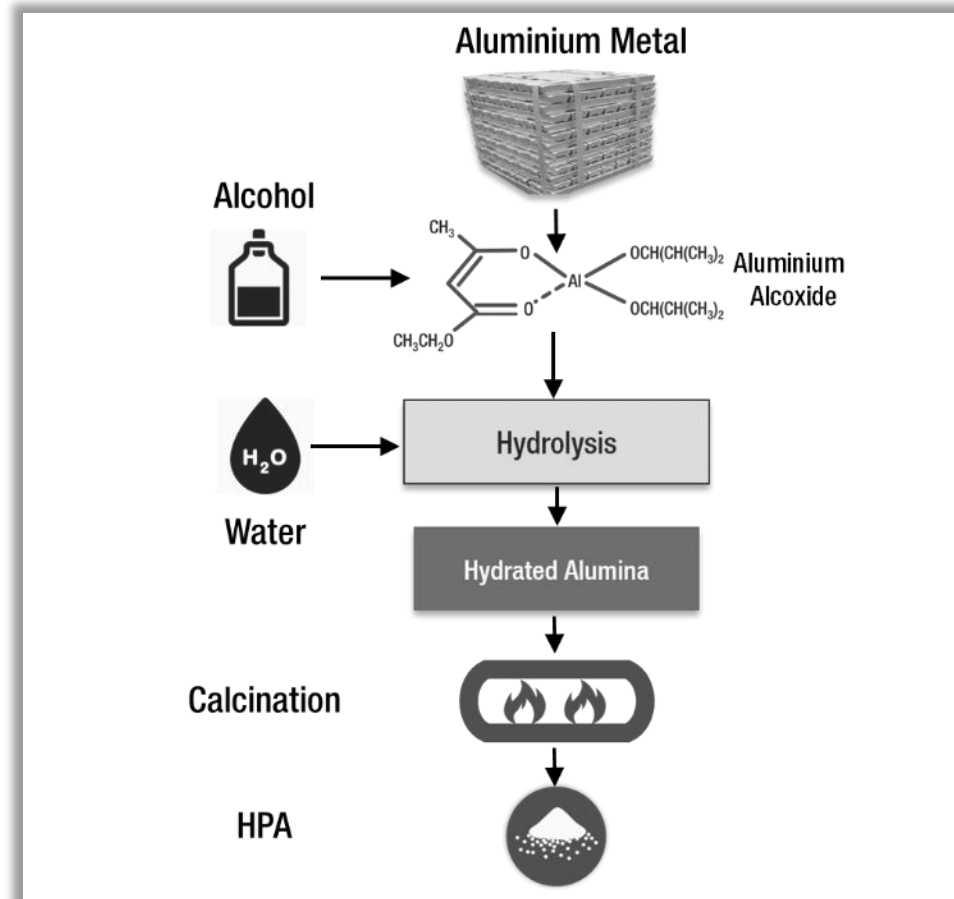
Existing HPA production is synthesised from Aluminium metal feedstock or produced from hydrochloric acid leach of kaolin clay.

HPA from kaolin – schematic flow sheet



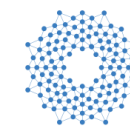
Source: various company and technical presentations

HPA from Al metal – schematic flow sheet



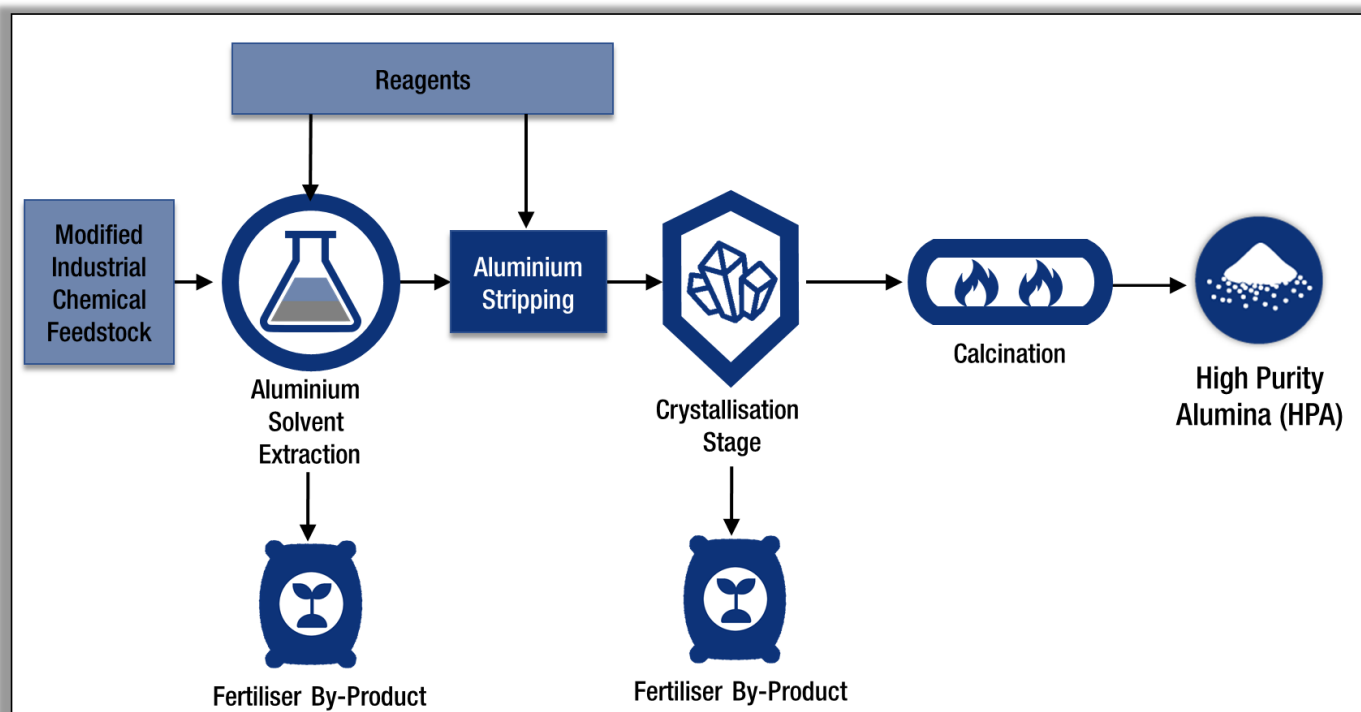
Source: Sumitomo Chemicals

HPA Process technology based on established SX process

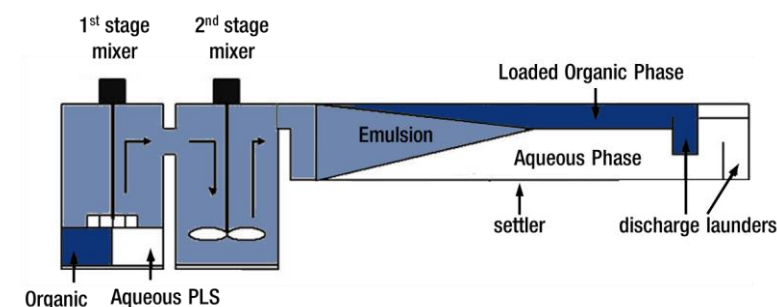


Alpha HPA

- Alpha HPA holds an Australian Proprietary, unique and innovative process approach to HPA production – including by-product credits – **producing HPA from an aluminium chemical feedstock**
- Based on established **Solvent Extraction (SX) Process** (SX accounts for ~25% of global copper production)
- Highly selective process delivers HPA purity
- Atmospheric wet chemical process – no high-risk pressure vessels



Copper SX Plant - Chile



‘HPA FIRST’ - FAST TRACK PATH TO HPA PRODUCTION

The HPA First process uses the Company’s proprietary licenced solvent extraction (SX) and refining technology and a feedstock blend of readily available industrial products rather than mine generated feedstock

SIMPLE



Does not require a mining operation

- Simplified flow sheets with no mining operations or tailings
- Uses established, atmospheric pressure wet chemistry process
- Single site industrial location

COMPELLING



Compelling business case:

- Dominant HPA revenue fast tracked
- Production rate of 10,200tpa HPA
- Unit cash costs of A\$6,830 (US\$5,123)/t HPA after by-product credits
- Annual pre-tax free cash flow (FCF) of A\$265M (US\$199M)

FAST



Fast track to cashflow:

- Faster DFS – simpler pilot plant
- Faster Permitting - single site industrial zoning
- Faster track to financing and construction to operational cash-flow

'HPA First' – Pre-Feasibility Study – Updated Feb '19

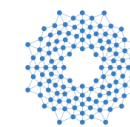


Alpha HPA

- The 'HPA First' PFS has delivered a compelling business case, capable of delivering 10,200tpa of 4N (99.99% purity) High-Purity Alumina (HPA) into the burgeoning HPA market
- PFS Highlights include:
 - Production rate of **10,200tpa** HPA
 - Unit cash costs of A\$6,830 (**US\$5,123**)/t HPA after by-product credits
 - Annual pre-tax free cash flow (FCF) of A\$265M (**US\$199M**)*
 - Project CapEx of A\$198M (US\$149M)
 - Capital Intensity of A\$19,417 (US\$14,563) per tonne of HPA
 - Sensitivity Analysis shows a strongly profitable project at HPA prices as low at US\$10,000/t
- Compelling financials achievable by commercialising the Company's innovative, proprietary process flow sheet
- The Company is now committed to immediately transitioning to a pilot plant and Definitive Feasibility Study (DFS) to position the Company to make a Final Investment Decision (FID)

* Assumes HPA Pricing of USD\$25,000/tonne

'HPA First' – Key Financial Metrics



Alpha HPA

	A\$	US\$
HPA Production (t/y)	10,200	
HPA Price Assumption (per/t HPA)	\$33,333	\$25,000
Annual Revenue (including by-products)	\$413 million	\$310 million
Annual Average Cash Operating Cost	\$143 million	\$107.5 million
Unit Cash Cost accounting for by-products (per/t HPA)	\$6,830	\$5,123
Annual Free Cash Flow (FCF)	\$247 million	\$185 million
Annual EBITDA	\$265 million	\$199 million
Aluminium Feedstock Processed (t/y)	20,400	
Capital Cost Estimate	\$198 million	\$149 million
Capital Intensity (CapEx\$ per tpa HPA)	\$19,417	\$14,563
Payback (years)	Less than 2 years	

Site Selection: Strategic Options

- The 'HPA First' process allows for the **discretionary location of an HPA Plant** within an existing industrial zone offering highly favourable logistics
- Gladstone SDA (QLD), Kwinana (WA) and Newcastle Port (NSW) offer industrial processing facilities, extensive infrastructure and an appropriately skilled workforce to construct and support the HPA Plant
- Each area has large bulk and container port facilities to utilise for the import of feed materials, key equipment and export of HPA product
- Each area is strategically located near likely suppliers of key reagents and by-product offtake partners
- Final site selection due Sept Qtr 2019



Alpha HPA

Corporate Snapshot



Alpha HPA

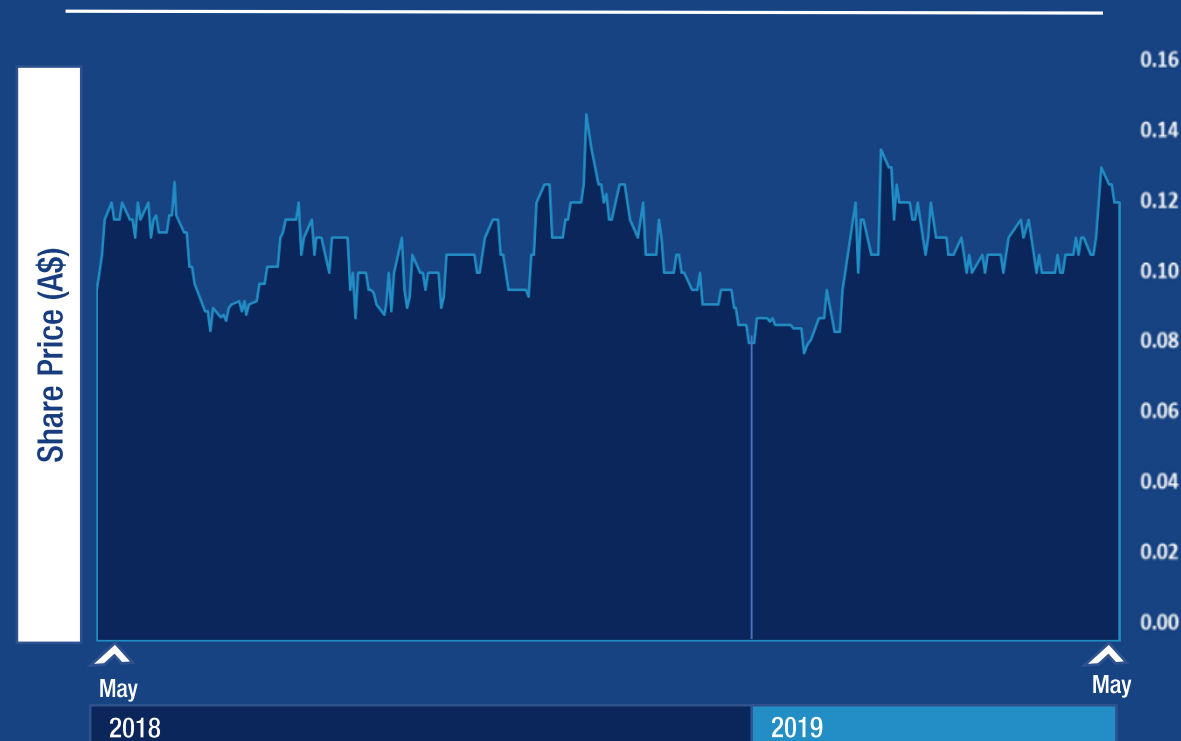
TRADING INFORMATION

ASX CODE	A4N
Share Price (31-May-19)	12.5c
52 week trading range	8.2c – 14.0c
Issued Shares	567.1M

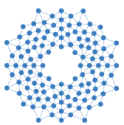
CAPITAL STRUCTURE

Issued Shares	567.1M
Unlisted options (@10c)	30.0M (expire 31 October 2019)
Unlisted options (@15c)	12.0M (expire 31 October 2020)
Unlisted options (@20c)	10.0M (expire 31 July 2022)
Market Cap (fully diluted)	\$77.4M
Cash (est. Jun-19)	\$1.2M
Enterprise Value	\$76.2M

SHARE PRICE PERFORMANCE



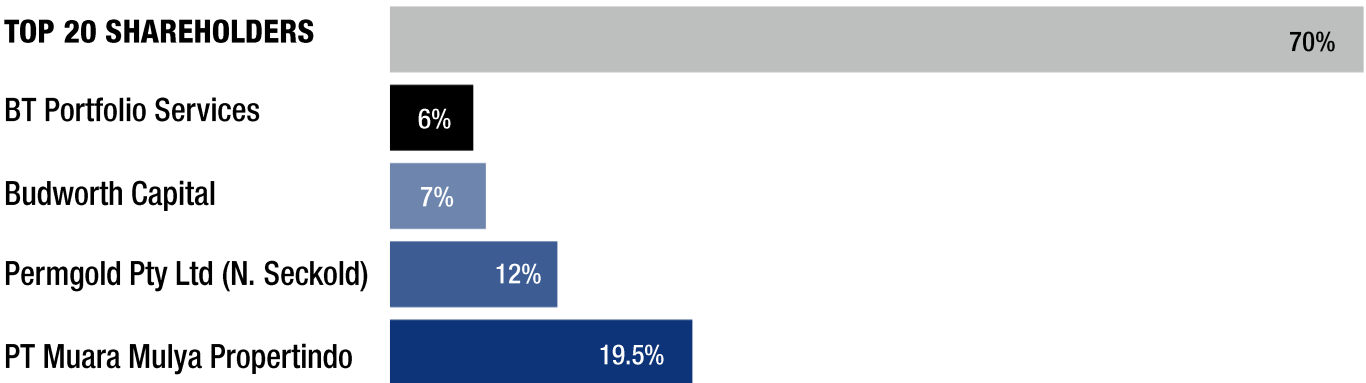
Corporate Snapshot



Alpha HPA

SHAREHOLDERS

TOP 20 SHAREHOLDERS



RECENT HIGHLIGHTS

2017/2018

99.99% HPA

4N (99.99%) purity achieved in HPA testwork program

HPA FIRST

Adoption of the HPA First process



\$4.0M underwritten Rights Issue (July 2018)



First HPA production using the HPA First process

PFS



Board & Management



Alpha HPA



Norman Seckold

Chairman

30+ years in the full time management of natural resource companies. Past Chairman and Director of listed companies including Bolnisi Gold NL, Timberline Minerals Inc., Perseverance Corporation Limited, Valdora Minerals NL, Palmarejo Silver and Gold Corp. and Cockatoo Coal Limited. Currently Chairman of Santana Minerals Limited and Planet Gas Limited and Deputy Chairman of ASX listed Nickel Mines Limited.



Rimas Kairaitis

Managing Director

20+ years experience in minerals exploration and resource development in gold, base metals and industrial minerals. Led the geological field teams to the discovery of the Tomingley and McPhillamy's gold deposits in NSW and steered the Hera gold-lead-zinc Project from discovery through to successful commissioning and commercial production. Previously founding Managing Director and CEO of ASX-listed Aurelia Metals.



Peter Nightingale

Director and CFO

20+ years as a Director or Company Secretary for a range of resource companies including Pangea Resources Limited, Timberline Minerals Inc., Perseverance Corporation Limited, Valdora Minerals NL, Mogul Mining NL, Bolnisi Gold NL and Cockatoo Coal Limited. Currently a Director Planet Gas Limited, Nickel Mines Limited and Prospech Limited.



Justin Werner

Non-Executive Director

20+ years' mining and management experience. Previously consulted to a number of blue chip mining companies including BHP, Rio Tinto and Freeport McMoran.

Successful track record of mine discovery and development. Currently Managing Director of ASX listed Nickel Mines Limited.



Tony Sgro

Non-Executive Director

Chemical Engineer with 45+ years' senior management experience in the supply of specialised equipment to the process industries with an emphasis on mining and oil & gas.

Co-founder, Director and General Manager of Kelair Pumps for 36 years.

Indicative Project Delivery Timetable



Alpha HPA

- Pilot-plant operation and DFS completion targeted for CY19 ahead of project construction starting CY20

			2018	2019				2020				2021				2022			
Task	From	To	DecQ	MarQ	JunQ	SepQ	DecQ	MarQ	JunQ	SepQ	DecQ	MarQ	JunQ	SepQ	DecQ	MarQ	JunQ	SepQ	DecQ
PRE-CONSTRUCTION																			
Pilot Plant + DFS	1/03/19	30/11/19																	
EIS	1/11/18	30/12/19																	
Regulatory Approvals	1/11/18	29/12/19																	
Marketing and Offtake	1/11/18	26/09/19																	
Financing	10/06/19	6/12/19																	
PROCESS PLANT																			
Establishment	1/01/20	31/03/20																	
Detailed Engineering	9/12/19	17/07/20																	
Procurement	6/01/20	4/06/21																	
Construction	30/09/19	8/10/21																	
Commissioning	11/10/21	18/02/22																	
Production Ramp-Up	21/02/22	9/02/24																	

HPA First Pilot Plant – commencing June 2019



Solvent Extraction Pilot Rig



Pilot Plant Filter Presses



HPA Pre-Cursor Room

‘HPA FIRST’ - FAST TRACK PATH TO HPA PRODUCTION

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SIMPLE



Does not require a mining operation

- Simplified flow sheets with no mining operations or tailings
- Uses established, atmospheric pressure wet chemistry process
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Norman Seckold
Chairman

nseckold@alphahpa.com.au

Rimas Kairaitis
Managing Director

rkairaitis@alphahpa.com.au

Peter Nightingale
Director/Chief Financial Officer

pnightingale@alphahpa.com.au

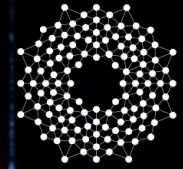
Justin Werner
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Cameron Peacock
Investor Relations and Business Development

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Alpha **HPA**

THANK YOU

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ALPHA HPA LTD (ASX:A4N)

Appendices

Appendix 1

Demand for HPA – Regions

Demand for HPA is primarily being driven by the increasing adoption of LED (Light Emitting Diode) products, separators in lithium ion batteries (Li-B's) and scratch resistant artificial sapphire glass for smartphone screens and watches



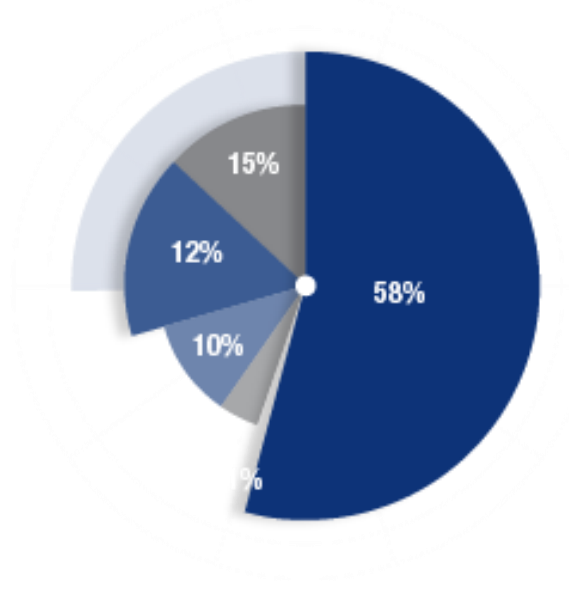
HPA DEMAND BY GEOGRAPHIC REGION (2016)



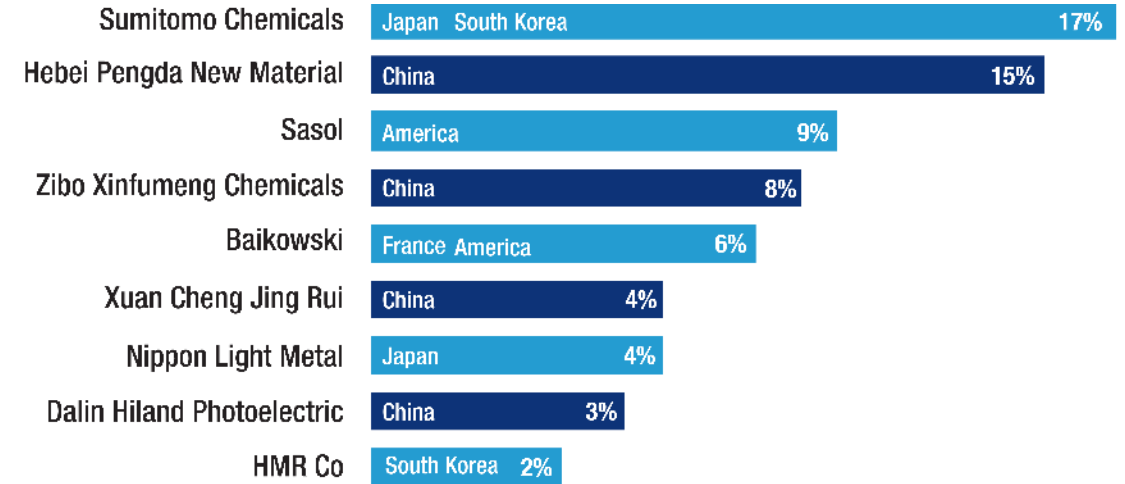
Growth demand is dominated by the APAC Region (~70% in 2016) primarily China, Japan and South Korea

As a would-be Australian based HPA producer, Alpha HPA is ideally placed to service the most dominant region of global HPA demand

Appendix 2 Supply of HPA



GLOBAL HPA SUPPLY DISTRIBUTION - 2016E



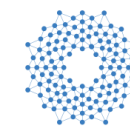
% EXPECTED 2016 OUTPUT

SOURCE: PERSISTENCE MARKET RESEARCH

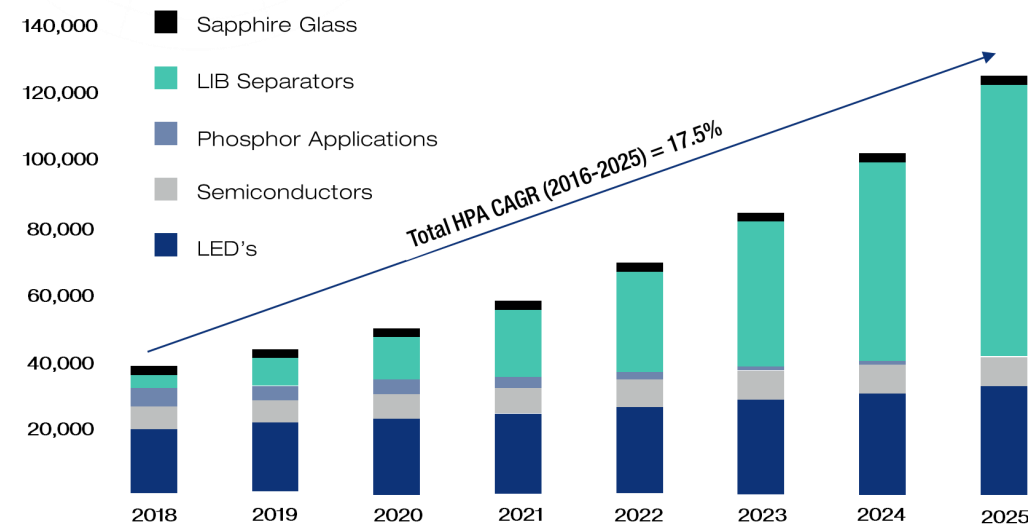
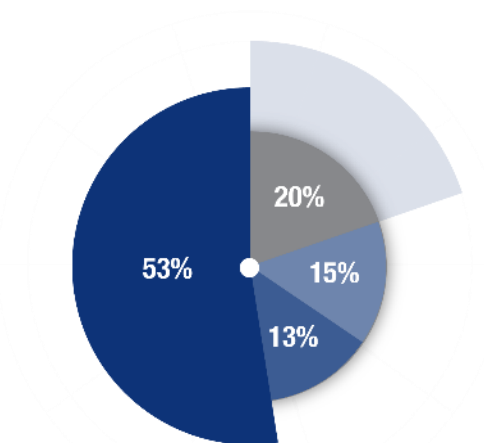
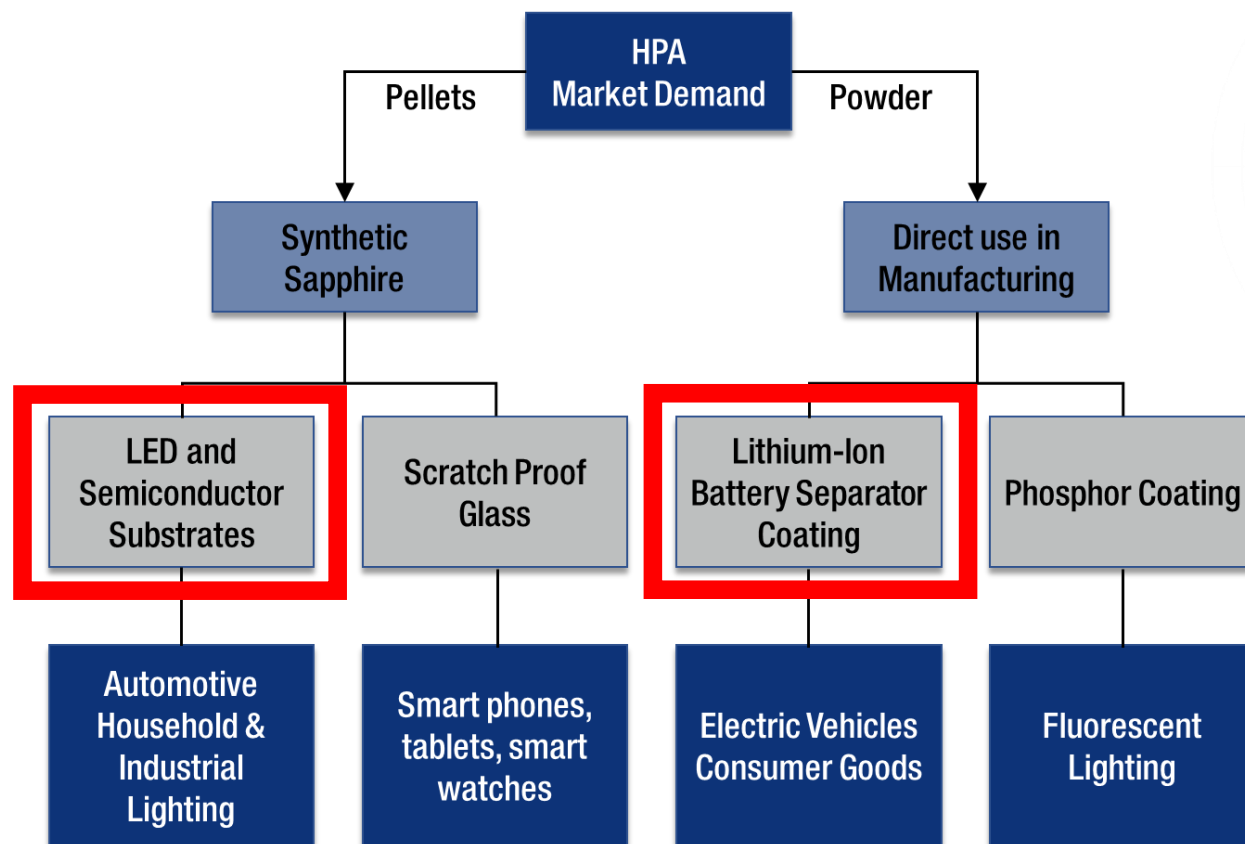
- Current HPA supply is concentrated in the Asia Pacific region (~83%) with China the most prolific producer
- Current production is Dominated by large diversified chemical companies where HPA is a non-core product and an immaterial percentage of revenue (< 5% for Sumitomo Chemicals)
- Alpha HPA sees enormous opportunity as a focused HPA producer to:
 - Become a genuine alternative supply source to the existing dominant APAC producing countries, and more importantly
 - Fill an expected supply shortage as forecast HPA demand escalates over the next decade
- Alpha HPA stands to become an extremely low-cost HPA producer
- Strong potential exists for long-term offtake agreements prior to commercial production

Appendix 3

High Purity Alumina (HPA) Market



Alpha HPA



Source: CRU

Appendix 4

Statement of Compliance



Alpha HPA

Competent Persons Statement (Process Development Testwork)

Information in this announcement that relates to metallurgical results is based on information compiled by or under the supervision of Dr Stuart Leary, an Independent Consultant trading as Delta Consulting Group. Dr Leary is a Member of The Australasian Institute of Mining and Metallurgy (AusIMM). Dr Leary has sufficient experience to the activity which he is undertaking to qualify as a Competent Persons under the 2012 Edition of the 'Australasian Code for reporting of Exploration Results, Mineral Resources and Ore Reserves'. Dr Leary consents to the inclusion of the technical data in the form and context in which it appears.

For further information on testwork results and processes see ASX announcements dated 20 November 2018, 6 September 2018, 6 August 2018, 9 July 2018, 30 April 2018, 26 April 2018, 21 March 2018, 6 March 2018, 21 February 2018, 8 December 2017, 30 November 2017, 29 November 2017, 24 November 2017 and 13 November 2017.

Appendix 5

Modifying Factors



Alpha HPA

Criteria	Commentary
Study Status	<p>The 'HPA First' Pre-Feasibility Study (PFS) indicates the project is technically and financially viable. The Study was completed by Prudentia Process Consulting, with input from the Company and other specialist consultants. The activities and findings of all other disciplines are summarised in the PFS document, and detail derivation of other modifying factors such as processing recoveries, costs, revenues, government and permitting.</p> <p>Overall the results of the PFS demonstrate that the HPA project is technically and financially robust.</p>
Mining factors or assumptions	The HPA First PFS does not assume any material sourced from a mining operation
Processing (including Metallurgical factors or assumptions)	<p>The production of HPA using a Solvent Extraction (SX) based process is a novel process flow sheet.</p> <p>The process plant design can be summarised by the following sequential activities:</p> <ul style="list-style-type: none"> • The preparation of the industrial feedstock blend • Solvent extraction of the feedstock solution to produce an aluminium strip liquor and aqueous solution of dilute fertiliser by-product (raffinate). • Production of fertiliser by-product A from the raffinate involving evaporative crystallisation, dewatering, drying and packaging. • Crystallisation of the aluminium salt from aluminium strip liquor. • Production of HPA pre-cursor. • Calcining of HPA pre-cursor to HPA, micronizing and packaging. • Evaporation circuit to produce fertiliser by-product B <p>The process flow sheet has been validated for the purposes of the PFS through the following testwork:</p> <ul style="list-style-type: none"> • Bench scale SX and batch HPA refining • 2 x continuous SX mini-rig campaigns to produce aluminium strip liquors • 1 x processing of SX aluminium strip liquors to HPA assaying 99.99% purity <p>The process testwork was conducted on a blend of industrial aluminium chemicals from 2 x different vendors. Some minor feedstock variability between vendors was noted.</p>
Environmental and Permitting	<p>Alpha HPA Ltd has engaged AECOM Consultants to assist with the Environmental and Regulatory Approvals process required for the preferred Project Site at Newcastle Port, NSW.</p> <p>At the time of this report, AECOM are preparing a Preliminary Environmental Assessment (PEA), being the first stage of the NSW Approvals process for a State Significant Development (SSD)</p>

Appendix 5

Modifying Factors



Alpha HPA

Criteria	Commentary
Financial	<p>Project costs have been estimated by Prudentia Process Consultants on the basis below.</p> <p>CapEx: The capital cost estimate is provided at an accuracy level of +30% to -15%. The capital cost estimate has been based on the implementation of an Engineering, Procurement, Construction Management (EPCM) contracting strategy.</p> <ul style="list-style-type: none"> Pricing for mechanical equipment and packages are based on budget quotes sourced from reputable vendors or internal database information and scaled accordingly Contingency of 18% has been added to the total reflecting the status of engineering, maturity of the process technology and data contained within this pre-feasibility study No allowance for taxes, import duties, value added tax (VAT), goods and services tax (GST) and the like was made <p>The total capital cost is based on the direct cost of mechanical equipment delivered and installed at site. The cost of the mechanical equipment is based on the process flow diagrams, stream table, design criteria and equipment list. Over 75% of mechanical pricing is based on vendor budget quotes with the remainder a mix of in-house (Prudentia) database, internal estimates, factored estimates, internet sourced data and allowances.</p> <p>OpEx: The operating cost estimate has been calculated based on a first principle build-up including reagents, utilities, consumables, labour, general expenses, maintenance and contract services to operate the plant. The operating costs were apportioned into fixed costs and variable costs with adjustments made to variable costs in the financial model for annual tonnage with ramp-up. Labour costs have been built up from an organisational chart typical of a processing facility of this scale. The annual operating costs at year 3 (full ramp-up) are summarised in Table 6, above, and are considered accurate to +/- 25%.</p> <p>Sensitivities: Sensitivity cases were considered by flexing key model inputs including sale price, operating costs and foreign exchange. The sensitivity analysis has been reported in EBITDA as there is no mine setting the project life. As expected with the operating margin the project is most sensitive to changes in the HPA product price in comparison to the other sensitivity factors modelled. Foreign exchange has the next biggest impact on the Project's EBITDA because the HPA price is traded in USD. The Project is fairly resilient to changes in operating cost.</p>
Marketing	<p>Alpha HPA Ltd commissioned the independent research group CRU to complete an HPA market study. The key conclusions of the study included:</p> <ul style="list-style-type: none"> The HPA global market is expected to increase from around 35kt in 2017 to 125kt in 2025, and 4N HPA produced by established suppliers in Japan, South Korea, USA and Europe is trading within the range of US\$25-50/kg A strong demand outlook and rising cost inputs are expected to place upwards pressure on prices. The main downside risk is increased competition from Chinese producers and changes to technology which reduce HPA intensity in manufacturing processes.
Social, legal and Governmental	<p>The final Project Location has yet to be determined, however the Company is investigating a number of sites within the Industrial Port area of Newcastle, NSW. The Company is advised by AECOM consultants with respect to Government Permitting and Environmental Studies</p>