**Altech Chemicals Limited (ASX:ATC)** 

**Company Presentation** 

Institutional

**Investor Information Pack** 

"Meeting a Sapphire Future"

Altech Chemicals

**January 2017** 



## **Corporate Snapshot**

## **Trading information**

Share price (18-Jan-17)	A\$0.160
52 week low / high	A\$0.082 / A\$0.205
Shares outstanding <sup>1,2</sup>	266.2m
Market capitalisation	A\$42.6m
Cash (30-Sep-16)	A\$10.2m
Debt (30-Sep-16)	Nil
Enterprise value	A\$32.4m

#### Top shareholders

Board & management	18.9%
Melewar International Investment Company – Malaysian Industrial firm mandated to construct HPA plant	6.4%
MAA Group Berhad  Malaysian insurance, investment, credit and finance group	4.4%
Top 20 shareholders	c. 42%

## **Share price performance (last 12 months)**



#### Source: IRESS

#### Note

- . Excludes 3.6m unlisted options with exercise price range of A\$0.20 to A\$0.30 and exercise date range of 31 January 2017 to 18 December 2017
- 2. Excludes 20.7m performance rights

A LEADING VERTICALLY INTEGRATED HPA DEVELOPER WITH A
DEFINED STRATEGY TO REACH PRODUCTION

ALTECH CHEMICALS LIMITED (ASX: ATC)

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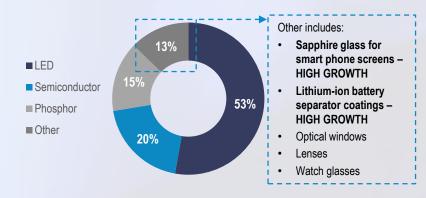


## What is HPA?

- High Purity Alumina (HPA) is a white, granular chemical that is a pure form of the commercially-produced aluminium oxide (Al<sub>2</sub>O<sub>3</sub>)
- HPA is the key ingredient for producing synthetic sapphire due to its physical and chemical properties including:
  - Extreme hardness
  - Corrosion resistance
  - Chemical stability and biocompatibility
- Sapphire is a special type of aluminium oxide used in a variety of high-end speciality applications including:
  - · Light-emitting diode (LED) production
  - The separator coating used in lithium-ion batteries
- HPA is produced by treating aluminium with certain chemicals or via the treatment of kaolin
- Purity is determined by the concentration of trace elements contained in the alumina compound (e.g. Sodium (Na), Magnesium (Mg) and Iron (Fe))
- Most common variants of HPA and associated indicative prices are:
  - Smelter Grade Alumina (SGA) (99.5% purity) US\$400/t
  - 3N HPA (99.9% purity) US\$6,000/t
  - 4N HPA (99.99% purity) US\$23,000/t
  - 5N HPA (99.999% purity) US\$50,000/t

Altech's premium and optimal product focus

## 4N HPA consumption by application (2016)

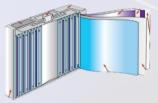


Source: Persistence Research

#### **Applications**









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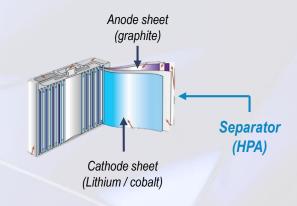
# **Clean Technology Applications**

- A growing awareness of the dangers of climate change has rapidly accelerated the commercial uptake of a number of clean-technologies, including lithium-ion batteries and LEDs
- Growing demand for these technologies is leading to accelerating demand for the required raw materials
- LED-based lighting applications (the largest growth driver of HPA demand) have arisen as an efficient alternative to conventional lighting products; LEDs are
  estimated to be up to 85% more efficient than conventional incandescent lightbulbs
- Technological transitions strongly supported by policy developments and government investment, examples include:
  - Japan intending to phase out incandescent and fluorescent bulbs by 2020
  - India aiming to replace 770m incandescent bulbs with LEDs by 2019

#### **LED lights**

# Market size (US\$m) 6,000 5,000 priven by government policies and emerging market uptake 2,000 1,000 2016 2020

#### Lithium-ion batteries



Source: LEDinside

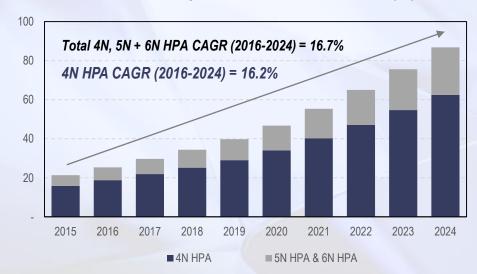
INCREASE IN HPA DEMAND DRIVEN BY ROLL-OUT OF CLEAN TECHNOLOGIES INCLUDING LITHIUM-ION BATTERIES AND LED LIGHTS



## **Demand for HPA**

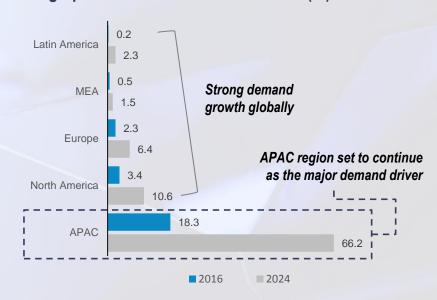
- Historical growth in demand for HPA has been driven by the increase in demand for LEDs
  - This is expected to continue with forecasted LED demand CAGR of c. 17.6% between 2016-2024
- Forecasted demand for HPA driven by structural changes in energy generation and greater interest in environmentally sustainable solutions
  - Largely used as separator coatings in lithium-ion batteries, sapphire glass for smartphones and further LED growth
  - Early indications that the iPhone 8 screen may utilise sapphire glass (produced from HPA)
- 2016 estimated HPA demand of 25.3kt (18.8kt 4N HPA, 6.5kt 5N and 6N HPA)
- 2024 estimated HPA demand of 86.8kt (62.5kt 4N HPA, 24.3kt 5N and 6N HPA)
- Demand highly concentrated within the APAC region, driven by China, Japan and South Korea (collectively >42% of total LED market in 2015)

#### Forecast annual consumption of 4N, 5N and 6N HPA (kt)



#### Source: Persistence Research

## **Geographical HPA demand distribution (%)**



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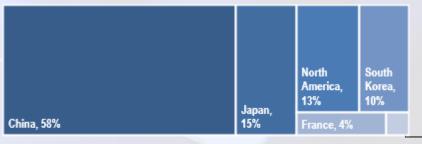
## Supply of HPA

- Robust demand growth underpins the need for significant HPA supply side investment and ramp-up
- Existing supply of HPA is dominated by large diversified chemicals companies and is highly concentrated in the APAC region (>80%)
- Expected 2016 global HPA production of 25.4kt (4N, 5N and 6N)
- Unlikely that large producers will make significant investment to increase production capacity, due to diversified operations and the low proportion of revenue generated from HPA production
  - Generally very low proportion of total revenue is derived from HPA production (e.g. less than 5% for Sumitomo Chemicals)
- Significant opportunity for specialty producers of HPA to bridge the looming supply shortage
  - In particular, those with lower processing costs that use alternative feedstock such as kaolin
- Significant advantage derived from being first to market due to substantial capital outlay required, long development lead times, high levels of product qualification and consumer relationship building required

## **Existing HPA producers**

Company	<b>Production locations</b>	% expected 2016 output
Sumitomo Chemical	Japan; South Korea	17%
Hebei Pengda New Material	China	15%
Sasol	USA	9%
Zibo Xinfumeng Chemicals	China	8%
Baikowski	France; USA	6%
Xuan Cheng Jing Rui	China	4%
Nippon Light Metal	Japan	4%
Dalin Hiland Photoelectric	China	3%
HMR Co	South Korea	2%

## Distribution of 2016E global HPA production (4N, 5N, 6N)



Source: Persistence Research

Russia, 1%

# ALTECH SET TO BE ONE OF THE FIRST SPECIALTY HPA PRODUCERS TO MARKET, PROVIDING A SIGNIFICANT COMPETITIVE ADVANTAGE

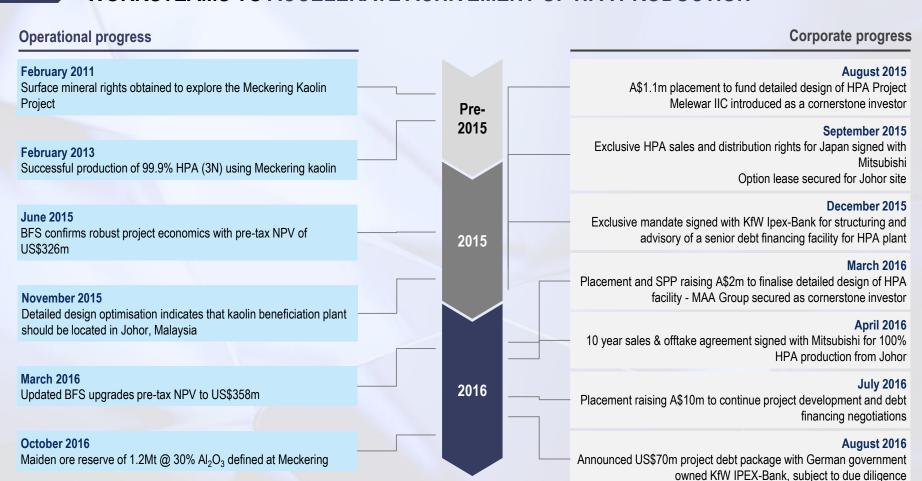
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# **Operational and Corporate Progress**

# SUCCESSFUL PROGRESSION OF NUMEROUS OPERATIONAL AND CORPORATE WORKSTEAMS TO ACCELERATE ACHIVEMENT OF HPA PRODUCTION





## **HPA Project: Overview**

- World-class vertically integrated HPA manufacturing project with 100% ownership of a kaolin deposit located in Western Australia and a proposed HPA plant located in Malaysia
- Altech acquired the upstream assets in 2011 and subsequently defined a high grade reserve which will provide feedstock to the HPA plant

## **Project locations**

#### **Downstream**

- Located in Johor, Malaysia
- Proposed 100%-owned HPA plant
- Project financing being finalised with KfW Ipex-Bank (German government)
- Construction expected to commence 2H 2017



~3,000km



99.99% HPA (4N) produced in Malaysia



Shipped from Fremantle (Perth's major port), Western Australia

#### **Upstream**

- · Located in Meckering, Western Australia
- 100%-owned kaolin resource
- 12.7Mt @ 29.5% Al<sub>2</sub>O<sub>3</sub> high grade aluminous clay deposit
- Mine development expected to commence in 2H 2017





## **HPA Project: Upstream**

- Located in Meckering, Western Australia, c. 130km east of Perth
- Current plans are to mine approximately 140kt of kaolin every 3 years
  - Mining of the 140kt will be completed in 2 months at the start of each
     3 year period and then stockpiled
  - The dry, raw kaolin product will be containerised and shipped from Fremantle at the rate of 42,055tpa
- The Meckering container loading facility is a two-man operation
  - Standard 20ft shipping containers are used to truck the kaolin to Fremantle and then ship to Malaysia
  - 36 containers to be shipped per week
- The ore body is flat lying, resulting in a very low, constant strip ratio of 1.08:1 and low mining costs
  - Current reserve will support a 30 year mine life
- Altech holds 100% ownership of the mining lease (M70/1334)
  - Altech submitted a mining proposal and mine closure plan to the WA Department of Mines and Petroleum in December 2016

#### Location



#### **JORC** resources and reserves

001101000	aroco arra	10001100	Yield	
	Category	Quantity (Mt)	(% of minus 300µm)	Minus 300μm Al <sub>2</sub> O <sub>3</sub> (%)
Ore reserve	Proved	0.45	69	30.1
	Probable	0.77	71	30.0
	Total	1.22	70	30.0
Mineral	Measured	1.5		30.0
resources	Indicated	3.3		30.0
	Inferred	7.9		29.1
	Total	12.7		29.5



## **HPA Project: Downstream**

- Proposed location of Altech's HPA plant is in the Tanjung Langsat Industrial Complex in Johor, Malaysia
- The site was selected based on several distinct advantages:
  - Approximately 60% cheaper operating costs
  - Readily available hydrochloric acid, power and natural gas from businesses within the industrial park
  - Proximity to international container ports and airports
  - Access to a skilled labour force at highly competitive rates
  - Corporate tax rate of 25%
- The proposed HPA plant has very strong environmental credentials given the waste products produced are non-toxic
  - Altech intends to sell silica residue to cement and brick neighbouring plants as feedstock
- HPA plant will have an initial production capacity of 4ktpa of 99.99% HPA (4N quality)<sup>1</sup>
  - This would position Altech as the largest producer of HPA in the world, surpassing Sumitomo's 3.2ktpa capacity
- The total BFS capital expenditure (without financing costs) for the plant is US\$69m (including contingency)
  - US\$70m German export credit facility expected to be provided by KfW IPX-Bank, subject to due diligence
  - Leading German engineering firm, M+W Group appointed as EPC contractor
- Refer to the Appendix of this presentation for the detailed operational flowsheet

#### Tanjung Langsat Industrial Complex, Johor, Malaysia



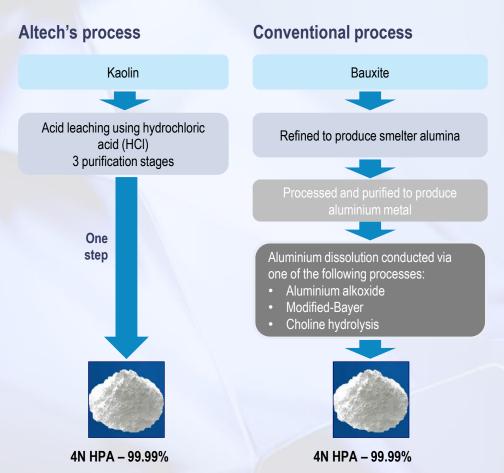
## **HPA** plant design



1. Refer to ASX announcement released 16 March 2016 titled "Altech Improves Financials of HPA Project with BFS Update". Refer to Disclaimer for further details on production target assumption



## **Altech's One-step HPA Process**



- With an established global market and growing demand, the commercial viability of HCl processing of kaolin to produce HPA is now established
- Altech's one-step process uses proven technology that was initially developed in the 1980s
  - Despite being a superior process, demand for HPA in the 1980's was negligible and alternative technologies (e.g. Bayer process) were commercialised for large scale production of smelter alumina

#### Advantages of the one-step Altech process:

- ✓ Lower cost feedstock
  - Altech expects its operating costs to be approximately half that of conventional technology
- ✓ Absence of sodium ions in Altech's HCl process (compared to Bayer's NaOH process) substantially reduces processing costs and improves quality of end product
- ✓ Less energy intensive
- ✓ Insulated from fluctuations in aluminium prices

SUPERIOR PROCESS SIGNIFICANTLY REDUCES THE COST AND ENERGY INTENSITY OF ALTECH'S HPA PROJECT



# **HPA Project: BFS Summary**

- An optimised BFS was released in March 2016 which highlights highly compelling financial metrics
  - High margin production with US\$55.7m EBITDA p.a. based on conservative HPA sales prices
  - IRR of 33.3%
  - NPV of US\$357.5m
  - Modest capital expenditure / NPV ratio of 0.22x
- Capital expenditure (without financing costs) for the plant has been estimated by Perth-based Simulus Engineering
  - Capital expenditure for both the Meckering beneficiation facility and Malaysia HPA plants is US\$78.7m
- BFS assumes a long term sale price for the Altech 4N HPA product of US\$23,000/t (FOB Malaysia)
  - Based on independent research by Persistence Research, a leading global authority on HPA
  - Represents a conservative approach to pricing assumptions relative to latest prices of US\$30,000/t (Japan)
- The BFS design minimises technological risk by selecting proven, high quality "off-the-shelf" plant and equipment
  - c. 70% of the plant equipment will be sourced from Germany and the European Union

#### **Key outcomes of BFS**

#### **Financial metrics**

Capital expenditure	US\$78.7m
Steady state annual revenue	US\$92.0m
Steady state annual operating costs	US\$36.3m
Steady state annual EBITDA	US\$55.7m
Gross margin on sales	61%

#### Valuation metrics

NPV (pre-tax, 9% real discount rate)	US\$357.5m
Payback period	3.7 years
Project IRR	33.3%
Capex / NPV ratio	0.22x

#### Key assumptions

Project life	30 years
Steady state annual HPA production	4,000tpa <sup>1</sup>
USD:AUD (capex and construction period)	0.70
USD:AUD (period of operation)	0.80
HPA sales price (4N, FOB Malaysia)	US\$23,000/t

#### Note:

Refer to ASX announcement released 16 March 2016 titled "Altech Improves Financials of HPA Project with BFS Update". Refer to Disclaimer for further details on production target assumption



# **HPA Project: Funding & Engineering Update**

#### **Funding overview**

- Altech expects to fund the development of the HPA project using a simple, sole lender, non-dilutive funding structure with one of Europe's leading international project and export finance banks
- An indicative term sheet has been received for a US\$70m debt funding package with German KfW IPEX-Bank
  - The combined project finance package is expected to include US\$60m of export credit finance at highly competitive terms (LIBOR +2% to 3%)
    - Export credit is a scheme that provides cover to bank lenders to insure against an export loan, and was identified as being applicable to Altech's HPA project because the majority of the project's plant and equipment will be sources from German / European manufacturers and the EPC contractor (M+W Group) is a German company
  - The remaining US\$10m is expected to be provided with standard commercial terms
- Thorough due diligence is currently being conducted by consultants on behalf of KfW IPX-Bank
- Definitive (EPC) project capital expenditure estimates are required in order to finalise the project financing agreements

## **Engineering: Detailed Design**

- Detailed design and engineering work is currently being undertaken by German firm M+W Group in Stuttgart, Germany
- M+W Group was appointed as Engineering, Procurement and Construction (EPC) contractor in March 2016
- Leading global engineering and construction firm with extensive Asian experience
- Established Singapore and Malaysian offices, with extensive Malaysian construction experience
- Detailed design is progressing well and on track

#### **HPA** plant administration building





## **HPA Peers**

#### **HPA-focused universe**

- Altech provides a unique investment exposure to pure-play HPA production
  - Altech are one of only two junior listed developers that are focused on near term HPA production (other being Orbite Technologies, listed on the TSX)
  - Altech's kaolin is highly superior to Orbite's
- Altech's upstream and downstream assets stand out relative to Orbite Technologies with superior qualities including:
  - Higher in-situ aluminia grades
  - Higher production capacity
  - Significantly lower capital intensity of development

#### Non HPA-focused producers

- Largest HPA producers are multi-national materials businesses where HPA is a significantly smaller, non-core focus
  - Chinalco (Chinese SOE)
  - Alcoa (US\$7.6bn market capitalisation)
  - UC Rusal (US\$8.7bn market capitalisation)
  - Norilsk (US\$13.0bn market capitalisation)
  - Sumitomo (US\$206.7bn market capitalisation)
- Generally very low proportion of total revenue is derived from HPA production

		122
Market capitalisation	43	
(A\$m)	Altech	Orbite Technologies
Exchange	ASX	TSX
Operational stage	Development	Commissioning
Downstream		
Asset	Meckering	Grande-Vallée
Geology	Aluminous clay	Aluminous clay
Location	Western Australia	Québec
Ownership	100%	100%
Resource Al <sub>2</sub> O <sub>3</sub> grade	29.5%	23.1%
Upstream		//
Location	Malaysia	Québec
Industrial process	Standard acid leaching	Orbite process
Production capacity	4,000tpa <sup>1</sup>	1,000tpa
Purity capability	4N	4N
Plant cost	US\$69.0m	c. US\$120m
Capital intensity	US\$17,250/tpa	US\$30,795/tpa
Waste produced	Treated (saleable)	Red mud (toxic)

Source: IRESS, Orbite Technologies Annual Information Form (March 2016) Note:

Refer to ASX announcement released 16 March 2016 titled "Altech Improves Financials of HPA Project with BFS Update". Refer to Disclaimer for further details on production target assumption





# **Board and Management Team**

## HIGHLY CREDENTIALED BOARD HAVING LED SOME OF THE WORLD'S LARGEST ADVANCED MATERIALS OPERATIONS (ALCOA, RIO TINTO)



Mr Luke Atkins Co-founder and Non-Executive Chairman

- Professional lawyer, with extensive experience in mining, exploration and corporate governance
- Current Non-Executive Director and former Executive Chairman of Bauxite Resources (ASX: BAU)
- Extensive capital markets experience having held a number of directorships at private and publicly listed companies, including Reclaim Industries Limited



Mr Iggy Tan **Managing Director** 

- 30 years' experience in the mining and chemicals sectors, with vast experience across project funding, construction, start-up and operations
- Has been involved in the successful commissioning of 7 resources projects internationally, including the A\$100m Jiangsu lithium carbonate plant in China
- Previous Managing Director of Nickelore (ASX: NIO), Galaxy Resources (ASX: GXY) and Kogi Iron (ASX: KFE)



**Mr Peter Bailey** Non-Executive Director

- Over 40 years' experience as a qualified engineer in the mining and industrial mineral production industries
- Previous president of the Bauxite & Alumina division of Alcoa (NYSE: AA), where he was responsible for Alcoa's 8 alumina plants outside of Australia
- Former CEO of Sherwin Alumina



**Royal Highness Prince Yaacob Khyra** Non-Executive Director

- Executive Chairman of Melewar Khyra Group, a Malaysian based diversified financial and industrial services group
- Current Director of Khyra Legacy Berhad and Ithmaar Bank
- Professional accountant and former CEO of Malaysian Assurance Alliance Berhad



Mr Dan Tenardi Non-Executive Director

- Mining executive with 40 years' industry experience
- Previous Executive of Rio Tinto's Robe River Iron, Managing Director of Bauxite Resources (ASX: BAU) and Chief Operating Manager at CITIC Pacific Mining
- Current Non-Executive Director of Grange Resources (ASX: GRR)



# **HPA Project: BFS Production, Pricing & Revenue**

- Production of HPA will occur from a single train with nameplate capacity of 4ktpa<sup>1</sup>
  - Production capacity will position Altech as the world's largest HPA producer
- Conservative 5 year ramp-up timeline to nameplate capacity
  - First 3 years of production will be a blend of 4N, 3N and smelter grade HPA
  - 100% production of 4N HPA expected by fourth year

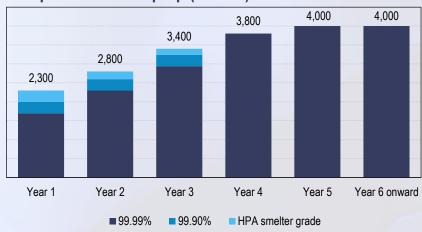
<b>Pricing assumptions</b>	(US\$/kg)	(A\$/kg)
4N HPA – 99.99%	23.00	28.75
3N HPA – 99.9%	9.00	11.25
HPA (smelter grade)	0.40	0.50

- Straight line pricing assumed for all grades of HPA at a conservative long-term selling price
  - Conservative pricing relative to latest prices of US\$30,000/t (Japan)

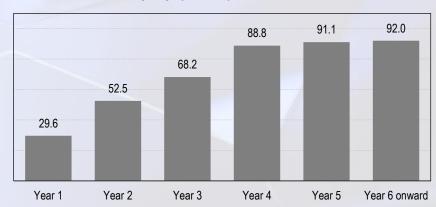
#### Note:

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## **HPA** production ramp-up (tonnes)



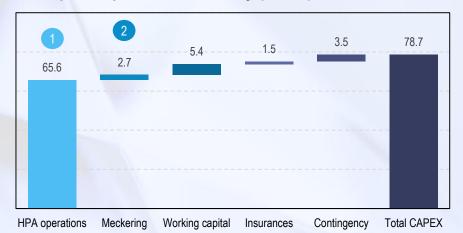
## Total revenue ramp-up (US\$m)





# **HPA Project: BFS Capital Expenditure**

## Total capital expenditure summary (US\$m)



## **Detailed Meckering capital expenditure (US\$m)**

Capital expenditure	
Kaolin loading facility	0.3
Mobile equipment	0.5
Installation, civils, electric and piping	0.5
Total indirect costs	0.3
Other	1.1
Total capital expenditure	2.7
Contingency (5.5% of all costs excluding other)	0.1

## **Detailed HPA plant capital expenditure (US\$m)**

#### **Capital expenditure**

Kaolin beneficiation and liquid separation	2.5
Kaolin calcination and kaolin leach	3.6
Crystallisation	4.7
Aluminium chloride hexahydrate roast and calcine	2.3
Product washing and drying	0.9
Micronising and packaging	1.1
Hydrochloric acid recovery	7.9
Tail gas scrubber	0.1
Silica residue neutralisation	0.8
Process and stormwater	0.6
Reagents	0.9
Water and utilities	3.0
Installation, civil, electric and piping	23.2
Total indirect costs	10.3
Other	3.5
Total capital expenditure	65.6
Contingency (5.5% of all cost excluding other)	3.4



# **HPA Project: BFS Operating Costs**

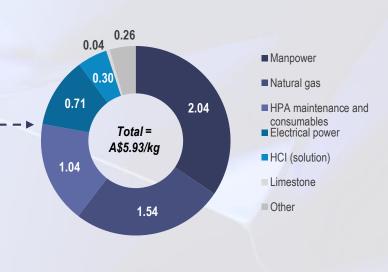
## **Operating costs summary**

- Total operating costs at production capacity are expected to be US\$36.3m p.a. (A\$45.4m) per the BFS
  - These operating costs are estimated to be c. 60% lower relative to an equivalent plant operating in Western Australia due to cheaper labour and input costs in Johor, Malaysia
- The operating costs in the BFS are based on actual quotations from service providers for mining, transport and shipping, IT support, and insurance, and from published prices for consumables such as hydrochloric acid, power, water, gas and reagents
- Labour rates assumed in the BFS have been based on recent market survey data and overheads are estimated based on industry experience

#### Total operating cost summary (\$/kg HPA)

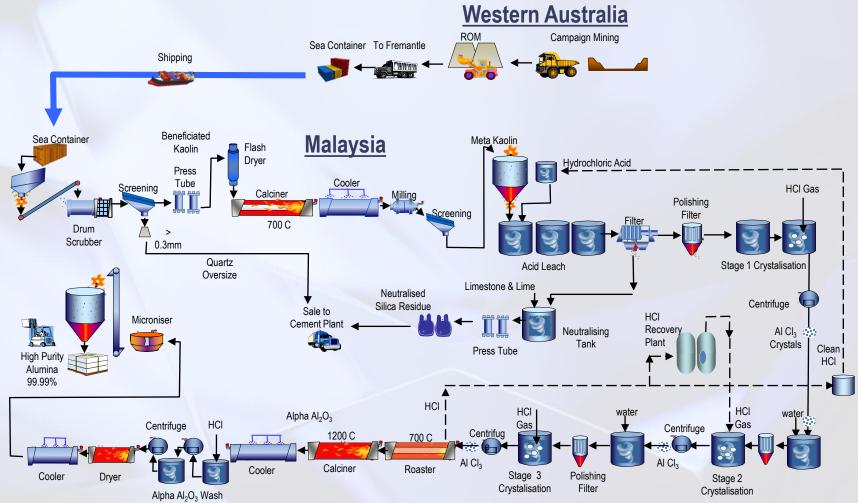
Activity	US\$/kg	A\$/kg
Meckering mining	0.10	0.12
Meckering kaolin loading	0.09	0.11
Transport (Meckering to Malaysia)	1.38	1.73
WA state royalty	0.04	0.05
HPA manufacturing (Johor)	4.75	5.93
HPA selling costs and misc.	1.33	1.66
Corporate (Australia)	0.98	1.23
Corporate (Malaysia)	0.41	0.51
Total operating costs	9.07	11.34

## **HPA manufacturing OPEX summary (A\$/kg HPA)**





## **HPA Process Flowsheet**



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## **Disclaimer**

#### **Forward-looking Statements**

This announcement contains forward-looking statements which are identified by words such as 'anticipates', 'forecasts', 'may', 'will', 'could', 'believes', 'estimates', 'targets', 'expects', 'plan' or 'intends' and other similar words that involve risks and uncertainties. Indications of, and guidelines or outlook on, future earnings, distributions or financial position or performance and targets, estimates and assumptions in respect of production, prices, operating costs, results, capital expenditures, reserves and resources are also forward looking statements. These statements are based on an assessment of present economic and operating conditions, and on a number of assumptions and estimates regarding future events and actions that, while considered reasonable as at the date of this announcement and are expected to take place, are inherently subject to significant technical, business, economic, competitive, political and social uncertainties and contingencies. Such forward-looking statements are not guarantees of future performance and involve known and unknown risks, uncertainties, assumptions and other important factors, many of which are beyond the control of our Company, the Directors and management. We cannot and do not give any assurance that the results, performance or achievements expressed or implied by the forward-looking statements contained in this announcement will actually occur and readers are cautioned not to place undue reliance on these forward-looking statements. These forward looking statements are subject to various risk factors that could cause actual events or results to differ materially from the events or results estimated, expressed or anticipated in these statements.

#### Competent Persons Statements - Meckering Kaolin Deposit

The information in this announcement that relates to Mineral Resources and Ore Reserves is extracted from the report entitled "Maiden Ore Reserve at Altech's Meckering Kaolin Deposit" released on 11 October 2016; the report is available to view of the Company's website www.altechchemicals.com. The Company confirms that it is not aware of any new information or data that materially affects the information included in the original market announcement and, in the case of estimates of Mineral Resources and Ore Reserves, that all material assumptions and technical parameters underpinning the estimates in the relevant market announcement continue to apply and have not materially changed. The Company confirms that the form and context in which the Competent Person's findings are presented have not been materially modified from the original market announcement.

#### **Production Target Statements**

Refer to announcement titled, "Altech Improves Financials of its HPA Project with BFS Update," dated 16 March 2016. Altech confirms that all material assumptions underpinning the production target and financial information derived from the production target continue to apply and have not materially changed.