

Altech Chemicals Limited ASX: ATC FSE:A3Y

**Australian Energy & Battery Conference
Company Presentation**

**Iggy Tan
Managing Director**



**Altech Chemicals
Limited**





Altech Chemicals
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**World leading producer of
high purity alumina (HPA)**



4,500 tonnes pa

Our Vision





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- **Sapphire & Ruby**
- **Natural form of high purity alumina (HPA) Al_2O_3**
- **Formed by mother nature like diamonds**
- **Colour from impurities**
- **Nearly as hard as diamond (Mohs 9)**



**Sapphire
Gemstone**



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- Purified alumina (Al_2O_3)
- 99.99% (4N) purity or greater
- Smelter Grade Alumina (SGA) ~ 99.5% (5,000ppm impurities, mainly sodium)
- Bayer Process uses sodium hydroxide (NaOH)
- Sodium impurity is problem for electronics industry



What is HPA?



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**Smelter Grade
Alumina**
SGA 99.5%
US\$400 per t



**High Purity
Alumina**
HPA 99.9% (3N)
US\$6,000 per t



**High Purity
Alumina**
HPA 99.99% (4N)
US\$27,000 per t



**High Purity
Alumina**
HPA 99.999% (5N)
US\$50,000 per t

Our Target Business

4N HPA produces synthetic sapphire glass

HPA substrate for LEDs

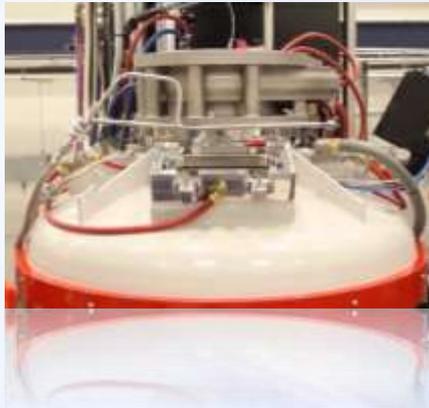
**High price
for purity**



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LED's & LITHIUM BATTERIES

Sapphire Furnace (2,000 °C)



Sapphire Crystal Boule



Sapphire Wafer LEDs



Nano Powder



Separator Coatings



LITHIUM ION BATTERIES





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Sapphire Applications

Sapphire Cores



Sapphire Wafer / Substrate



Sapphire Glass



Light Emitting Diodes LED



Smartphone and Lenses



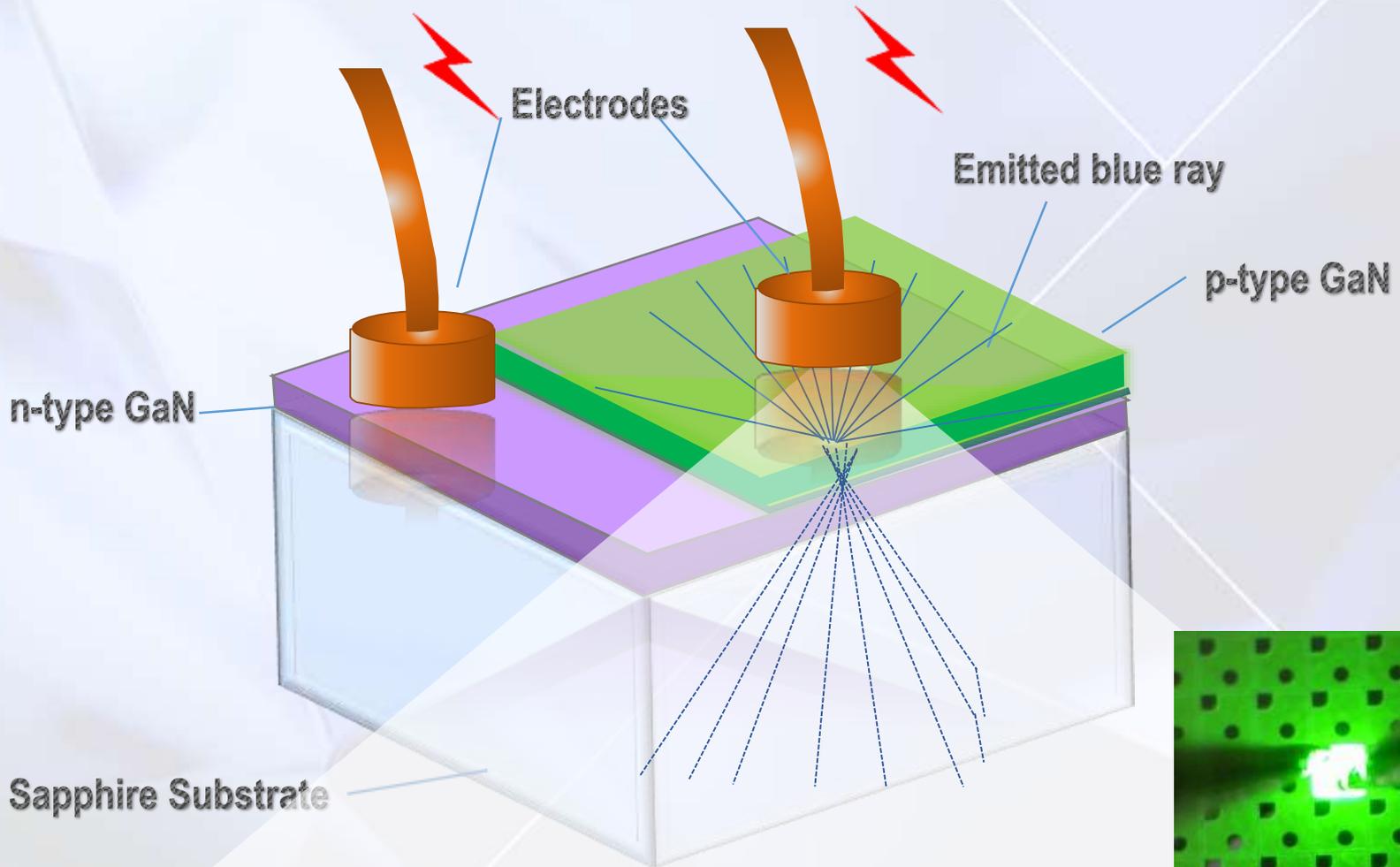
LEDs

Glass



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Light Emitting Diode





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LED Expansions

Osram opens \$440M Malaysian plant amid world's widening clamor for LED chips (UPDATED)

NOVEMBER 24, 2017 BY RAHUL1

Energy Efficient Lighting Market Rising at a CAGR of 13.4% from 2016 to 2024, will reach to US\$15 bn by 2024

LED UPSTREAM | LED APPLICATIONS |

ARTICLE COMMENTS (0) RELATED CONTENT

PRINT EMAIL

Sanan Optoelectronics to set up LED production base in southeastern China

Siu Han, Taipei; Adam Hwang, DIGITIMES [Thursday 7 December 2017]

The largest China-based LED epitaxial wafer and chip maker Sanan Optoelectronics has announced it will invest CNY33.3 billion (US\$5.03 billion) to set up an LED production base in Quanzhou, southeastern China.

Xiamen Changelight Purchases AIXTRON MOGVD Technology to Expands ROY LED Production

Sapphire Glass

Vertu T1 luxury smartphone



HTC U Ultra (128Gb)

- February 2017
- Sapphire crystal display



iPhone

- Sapphire crystal lens
- Finger print recognition

Smartphone
sapphire screen

HUAWEI

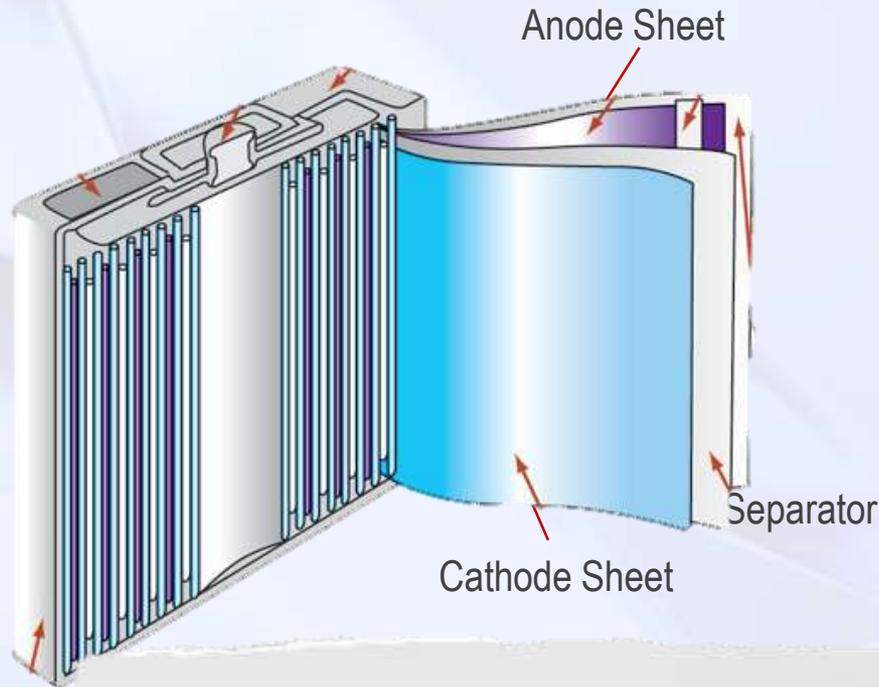
Sapphire Glass Scratch Test





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HPA used in Lithium-ion Battery Separator



Third-Generation Battery Safety Will Make
Current Battery Technology Obsolete

Sep. 26, 2016 4:29 PM



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Global High Purity Alumina Forecast 2015 -2024

Source: Persistence Market Research
"High Purity Alumina Market – Global Industry Analysis and Forecast 2016-2024"



**Demand
for HPA**

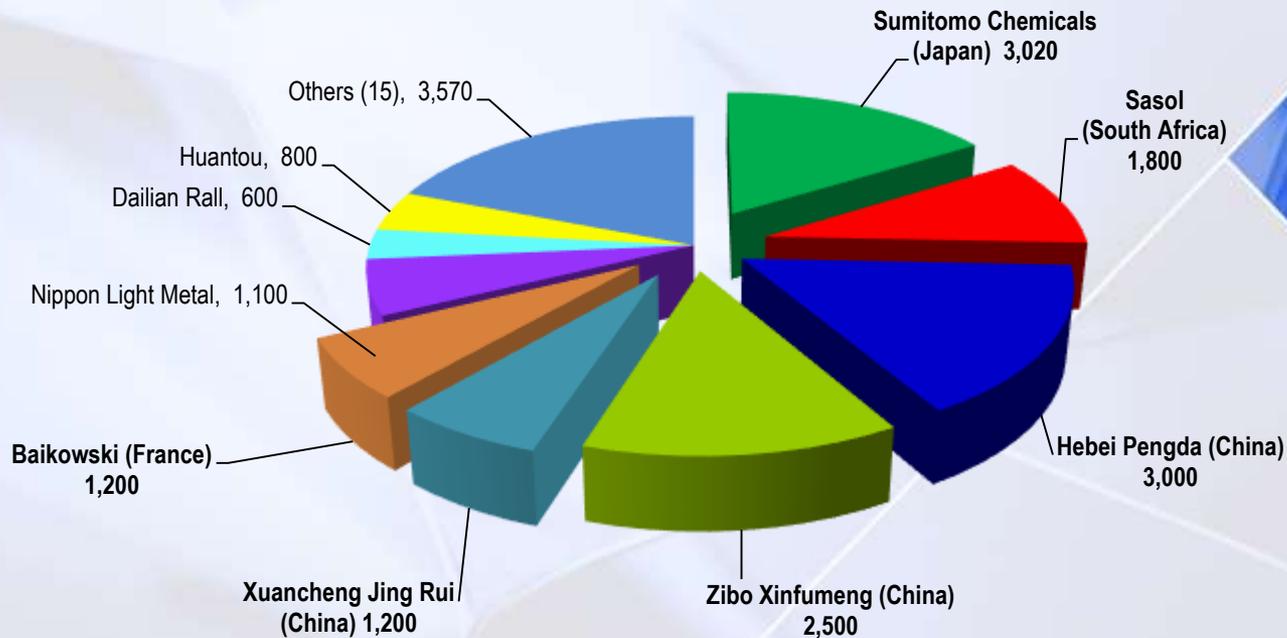
- **Global LED light demand forecast to increase to 4.1 billion by 2024 (2015: 864 million)**

Source: Navigant Research "LED Lighting: Global Outlook"



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- Six largest HPA producers:
China (3), Japan (1), South Africa (1) France (1)



**Current HPA
Producers**



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Altech's Differentiation

Current HPA Producers



Bauxite

Alumina Refinery



Smelter Grade Alumina
99.5%

Alumina Smelter



Aluminium Metal
~US\$3,000 per tonne

Aluminium Dissolution



99.99% (4N) HPA



Kaolin
(aluminous clay)

ALTECH HPA PLANT

One Single Process Step



99.99% (4N) HPA



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Typical bauxite deposit

Altech's kaolin deposit

Low-impurity Kaolin Feedstock

- **Very low iron (Fe) due to weathering**
- **12.7Mt JORC Mineral Resources[^] (250 yrs)**
 - Measured Resources 1.5Mt @ 30% Al₂O₃
- **Deposit in Western Australia**

%	Bauxite Darling Range*	Canadian HPA Project	Altech HPA Project
Al ₂ O ₃	34.5	22.77	30.5
SiO ₂	21.5	53.29	56.3
Fe ₂ O ₃	21.2	8.36	0.7
TiO ₂	2.00	0.98	0.7
K ₂ O	0.24	3.41	0.1
NaO	0.005	1.42	0.1

* Typical Mean Analysis

[^] JORC (2012) Mineral Resources (refer ASX Announcement 11 October 2016); the Company is not aware of any new information or data that materially affects the information included in this announcement and confirms that all material assumptions and technical parameters underpinning the estimates continue to apply and have not materially changed.



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- Mining approval granted
- Works approval granted
- Option to purchase land exercised
- Simple mining – 3 years feed in 2 months
- Then just sea container loading operation
- Fremantle to Johor easy shipping



Meckering Kaolin Deposit in West Aust





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- **Chemical-zoned industrial park (Tanjung Langsat)**
- **50-60% lower operating costs**
- **HCL plant nearby**
- **Services, natural gas, electricity, water**
- **Access to 17th largest container port**
- **Malaysian government incentives**
- **Environmental approval completed**

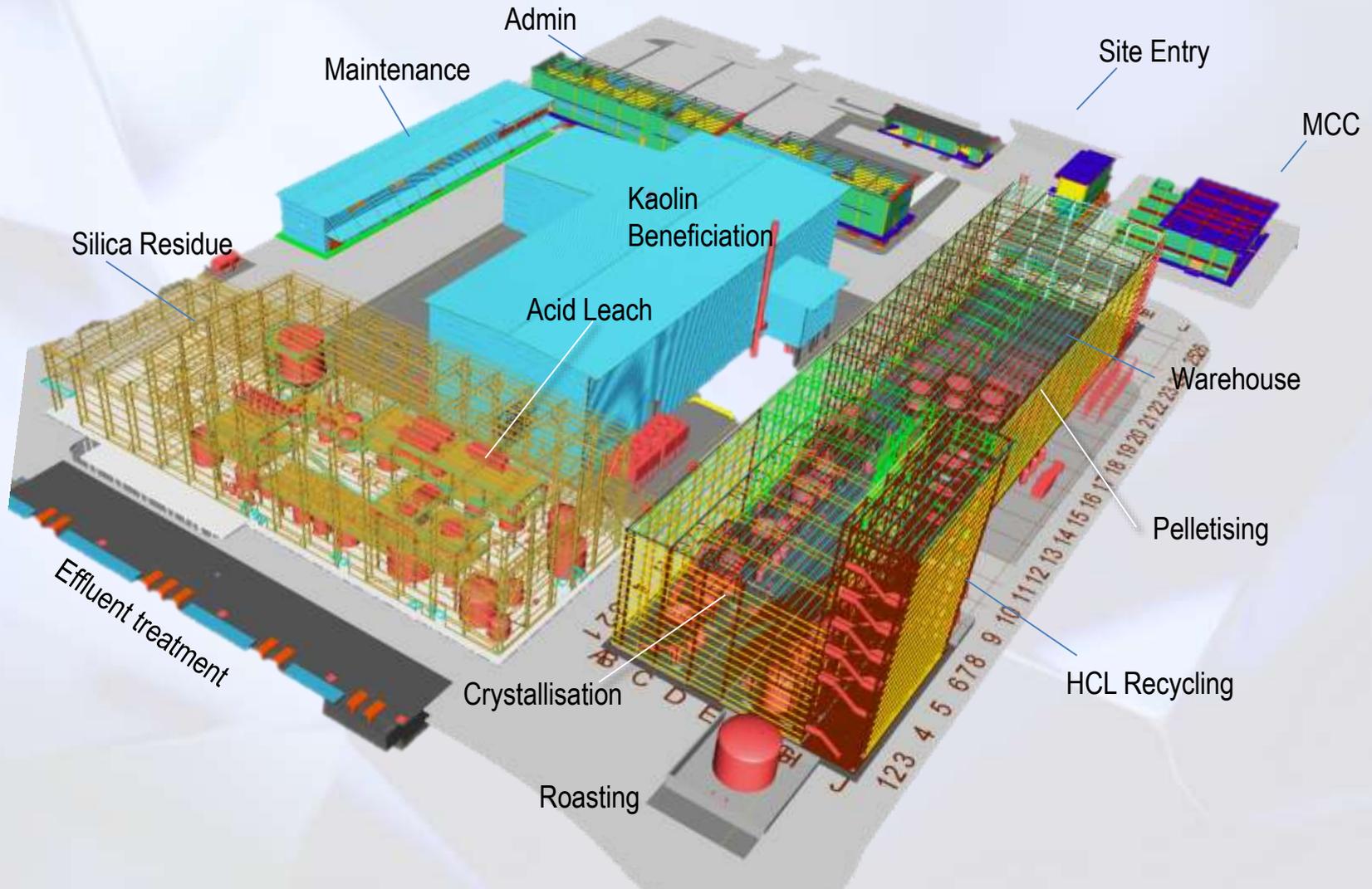


**HPA Plant to
be in Johor,
Malaysia**



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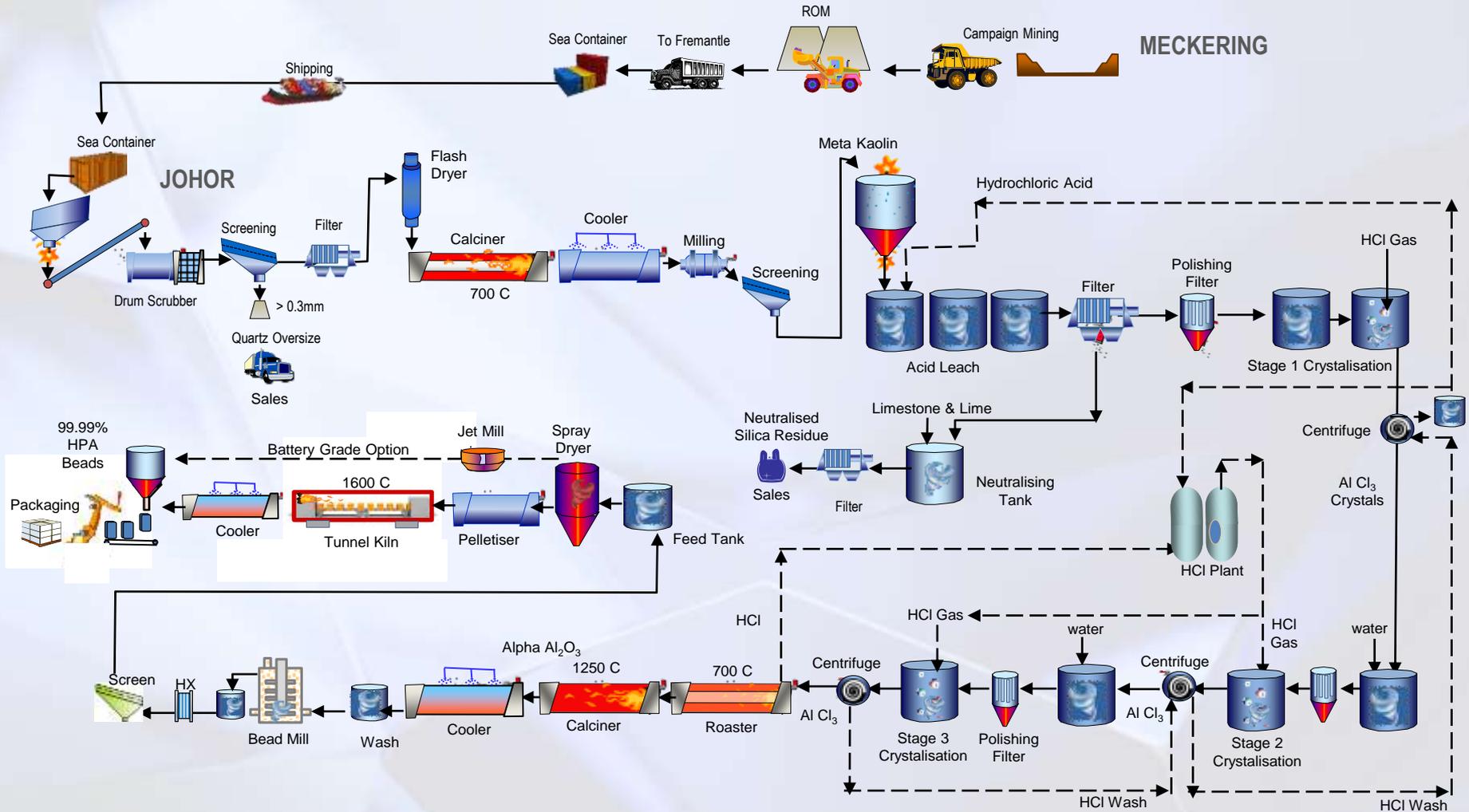
Johor HPA Plant





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Altech's HPA Process





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- **Pre-tax NPV_{7.5} US\$ 505 million**
- **Internal Rate of Return (IRR) 22%**
- **Payback (full rate) 3.9 years**
- **EBITDA US\$ 76 million p.a.**
- **Capital cost US\$ 298 million**
- **Production Costs - US\$ 9.90/kg**
- **LT Sale Price - US\$ 26.9/kg**
- **Gross Margin – 63%**

Final Investment Decision Study FIDS



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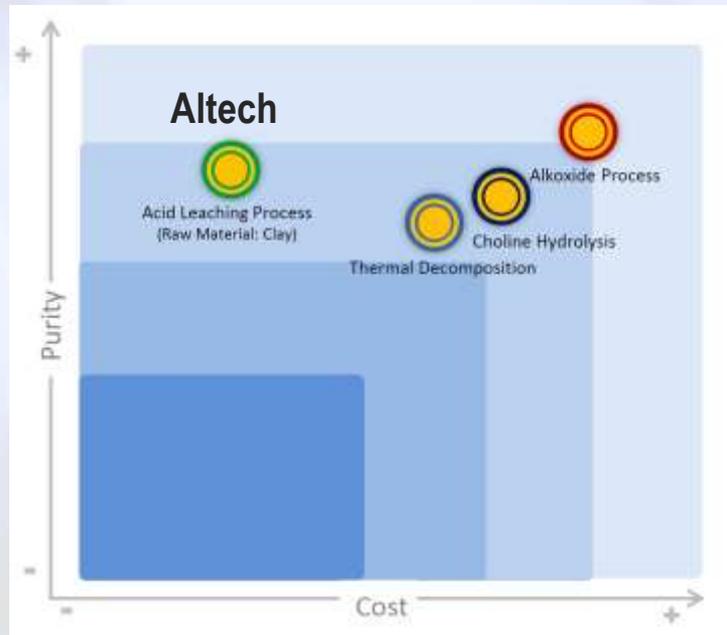
- **Current price in Japan - US\$ 40.0/kg**
- **Pre-tax NPV_{7.5} US\$ 1.1 billion**
- **Internal Rate of Return (IRR) 33%**
- **Payback (full rate) 2.2 years**
- **EBITDA US\$ 133 million p.a.**
- **Production Costs - US\$ 10.50/kg**
- **Sale Price - Gross Margin – 74%**

**High Case
Economics**



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- **Competitors US\$14 - 17,000/t (Breakaway Research)**
 1. **We own our feedstock**
 2. **Main reactant HCl re-used**
 3. **Plant in low cost country (Malaysia)**



**Bottom
Quartile
for Op Costs**



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- Off-take sales agreement with Mitsubishi
- First 10 years of HPA operations
- Secures sales for HPA plant production
- Exclusive global distributor
- Experienced with HPA
- Strategic priority: lithium-ion batteries



**Mitsubishi
signs
off-take**



mitsubishi

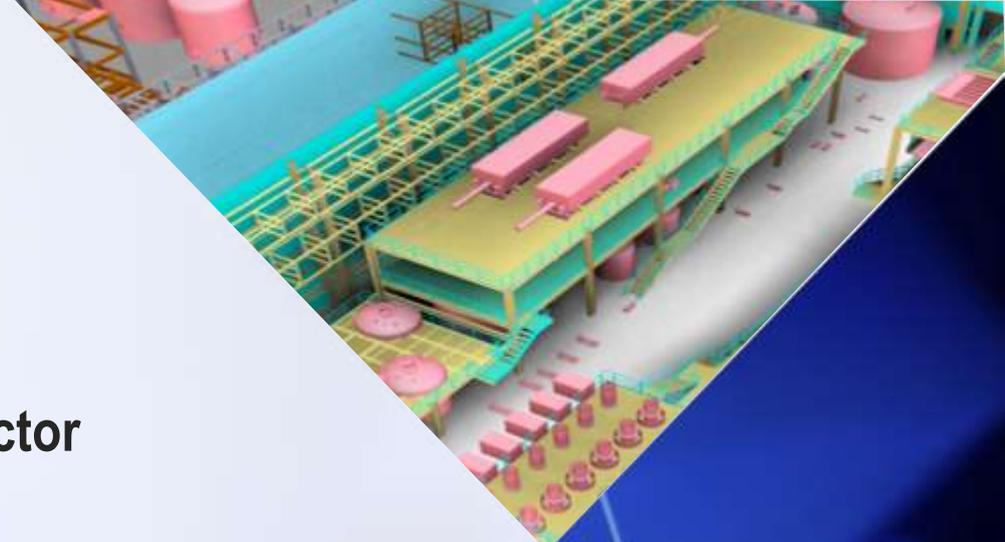


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- **SMS group German EPC contractor**
- **Lump sum turn key contract**
- **Completion and cost risk**
- **Throughout guarantee**
- **Process & quality guarantee**
- **Third largest user of ECA finance**
- **Committed US\$ 15 mil equity contribution**

SMS  **group**

**Lump Sum
Turn Key
Contract**





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- Debt funding with KfW IPEX-Bank
- Total debt of US\$ 190 million
- US\$ 170 million export credit finance
- 50% of plant – German suppliers
- Low interest, long tenure
- Best debt in the world

The background of the slide features a large, stylized blue 'KfW' logo in the upper right, set against a view of a modern building with large windows. Below the logo, the German flag (black, red, and gold horizontal stripes) is visible, partially obscured by a blue geometric shape. The text 'Debt Funding Successful' is written in white on a dark blue background in the lower right.

**Debt
Funding
Successful**



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- **Final stage - Balance of funds**
- **Subordinated mezzanine debt**
- **Target of US\$70-US\$120m mezz debt**
- **Possible JV Partner**
- **Equity investment partners**
- **Maximises shareholder returns and minimises dilution**

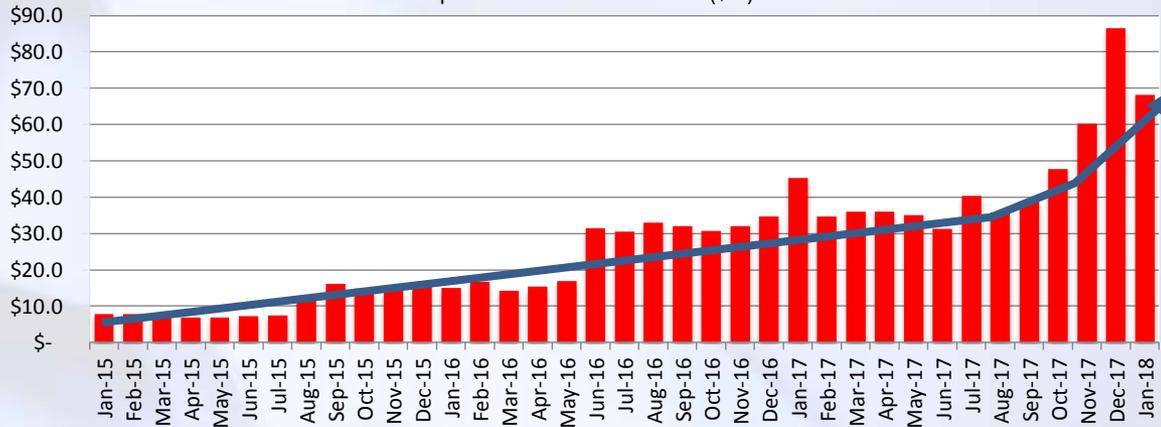


**Advancing
Final Stage
Funding**



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Altech Chemicals Limited
Market Capitalisation - end of month (\$m)



- **10 x steady market cap growth (3 years)**
- **Ave trade value \$2k/day to \$350k/day**
- **350% increase in shareholders to 2,500**
- **\$9 m cash, no debt**
- **420 m shares on issue**

**Altech
Growth
Performance**

ASX



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Right Place
Right Time
Right Feedstock
Right Technology



Thank you



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Forward-looking Statements

The Company reports that the ECA application process is set for end 2017 and there is no certainty that the export credit and debt finance will be approved. The Company makes no representation or warranties whatsoever as to the outcome of the ECA approval process

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 on 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.