

Altech Chemicals Limited ASX: ATC FSE:A3Y

Company Presentation

Iggy Tan
Managing Director



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



4,500 tonnes pa

Our Vision





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- **Sapphire gemstone**
- **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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HPA substrate for LEDs



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

**High price
for purity**

Our Target Business

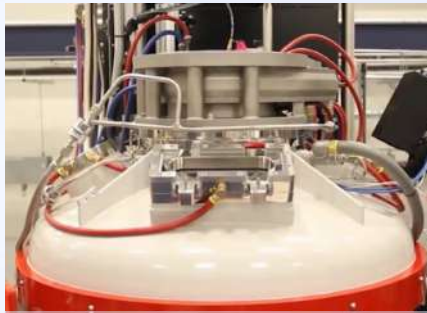
4N HPA produces synthetic sapphire glass



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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



Light Emitting Diodes LED



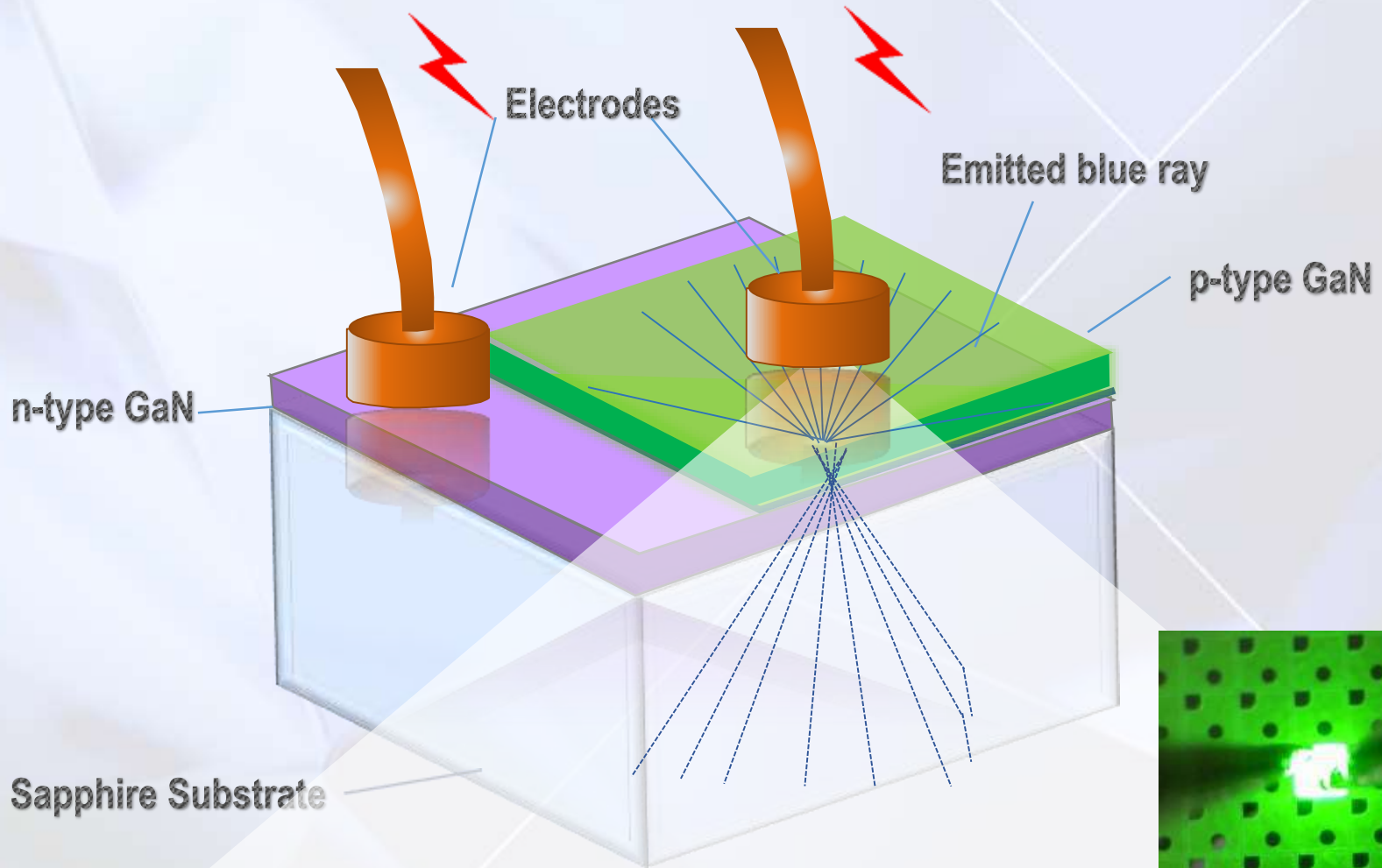
LEDs

LED's: 1/6th of the energy



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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



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Sapphire Applications

Sapphire Cores



Un-scratchable Applications

Sapphire Glass



Smartphone and Lenses



Glass



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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

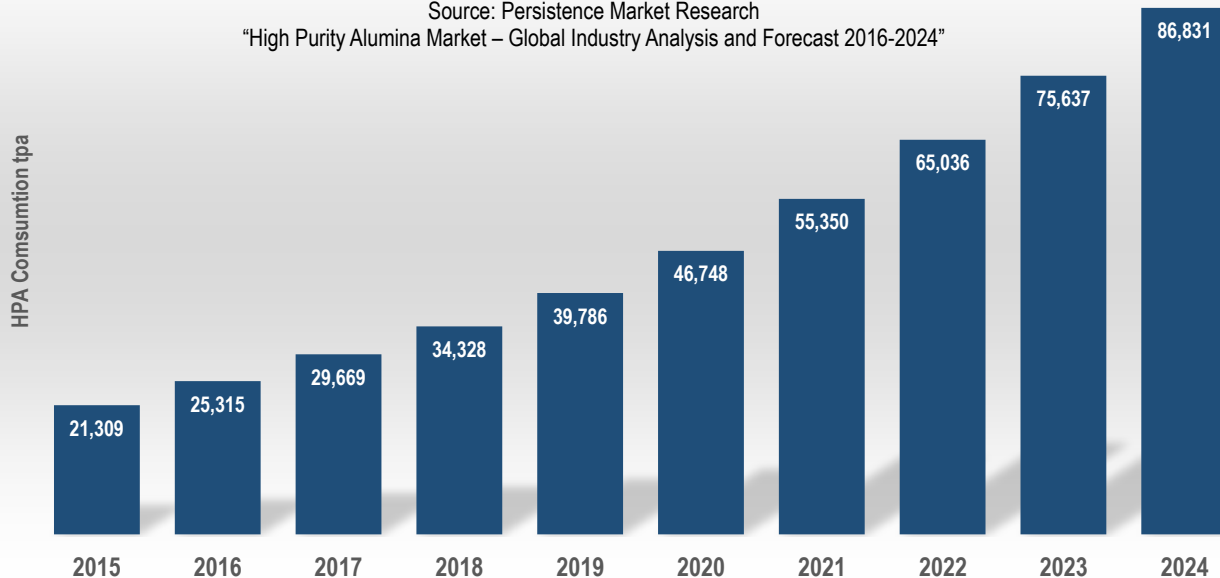




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Global High Purity Alumina Forecast 2015 -2024

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



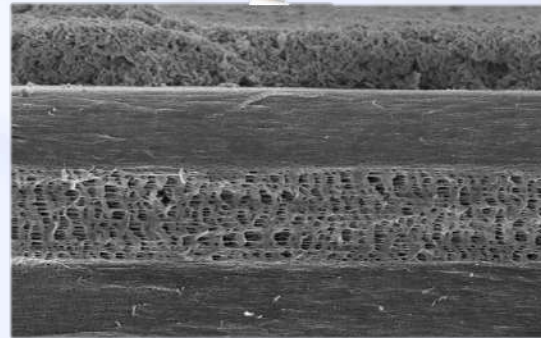
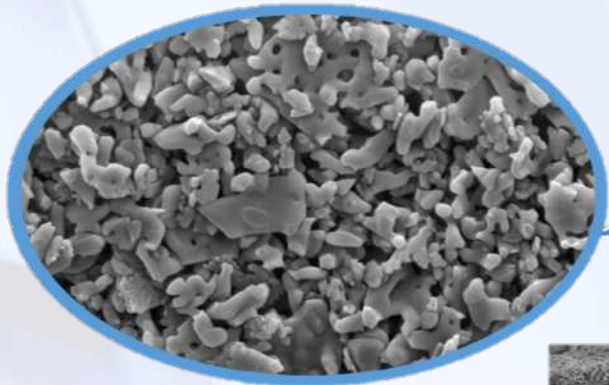
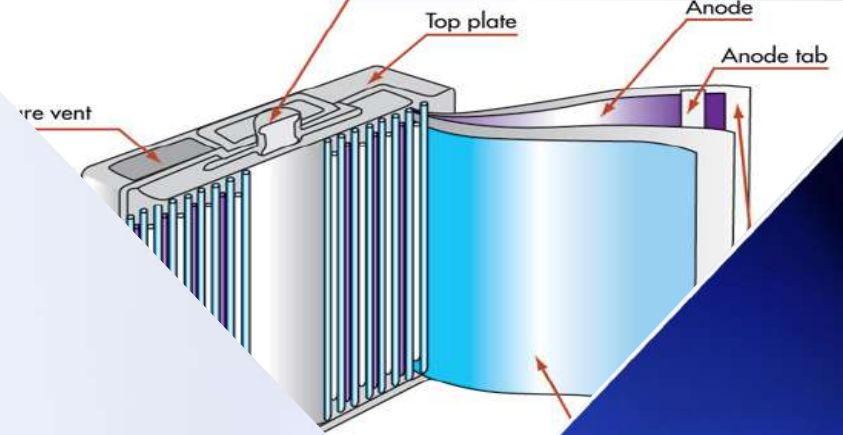
**Demand
for HPA**

- 13 times ATC's proposed 4,500 tpa HPA plant required to meet growth
- Global LED demand increase to 4.1 B units by 2024 (2015: 864 million)

Source: Navigant Research "LED Lighting: Global Outlook"



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HPA Coated Battery Separators

- Low shrinkage, increased life cycle and increased safety
- Enhanced short prevention and excellent structural integrity at high temperatures



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HPA Coated Separator Demand Forecast

- 1.6 kg HPA for average EV car (40 KWh)
- 6.4 kg HPA for EV Bus (160 kWh)



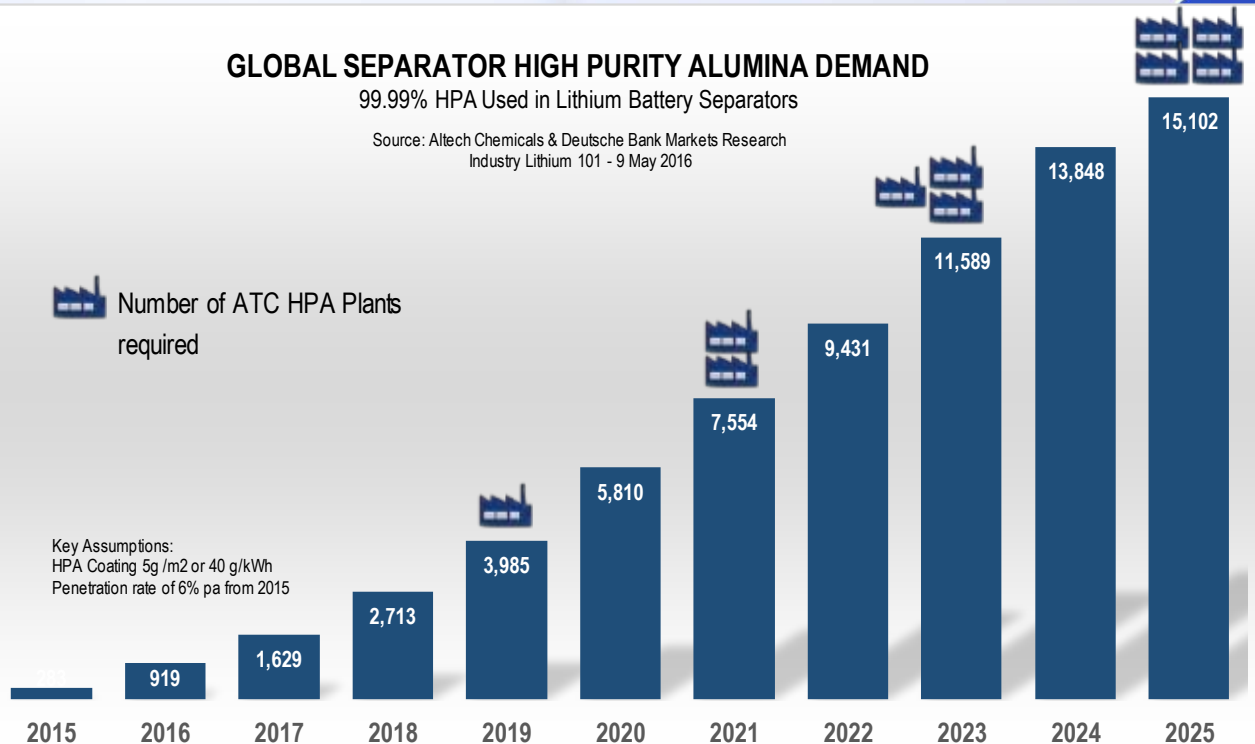
Separator Forecast Demand

GLOBAL SEPARATOR HIGH PURITY ALUMINA DEMAND

99.99% HPA Used in Lithium Battery Separators

Source: Altech Chemicals & Deutsche Bank Markets Research
Industry Lithium 101 - 9 May 2016

HPA Consumption in Li-Ion Battery Industry, tpa

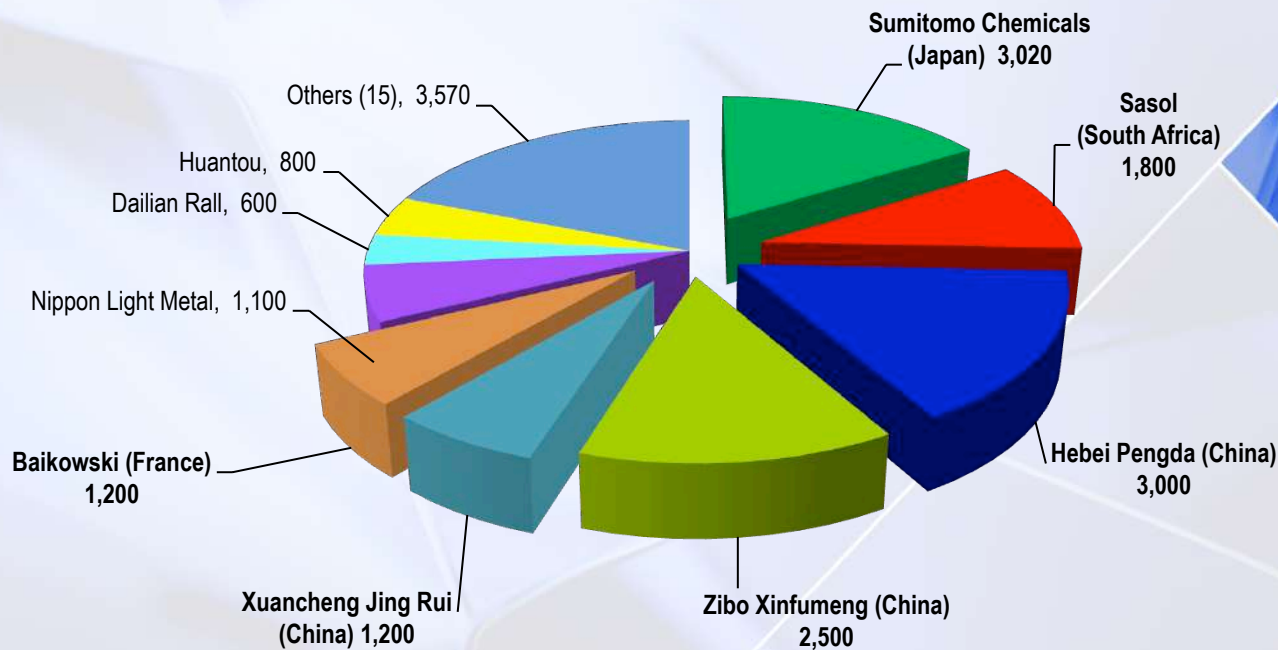


Key Assumptions:
HPA Coating 5g /m² or 40 g/kWh
Penetration rate of 6% pa from 2015



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- HPA producers – Chemical companies
China (3), Japan (2), 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
 - Indicated Resources 3.3Mt @ 30% Al₂O₃
 - Inferred Resources 7.9Mt @ 29.1% Al₂O₃
- **Deposit in Western Australia**

%	Bauxite Darling Range*	Altech Kaolin *
Al ₂ O ₃	34.5	30.5
SiO ₂	21.5	56.3
Fe ₂ O ₃	21.2	0.7
TiO ₂	2.00	0.7
K ₂ O	0.24	0.1
NaO	0.005	0.1

* Typical Mean Analysis (upgraded)

[^] JORC (2012) Mineral Resources and Reserve (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
- Simple free dig mining
- Campaign mining, 2 months 3 years feed
- 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)**
- **lower operating costs**
- **HCl plant nearby**
- **Services, natural gas, electricity, water**
- **Access to 17th largest container port**
- **Malaysian government incentives**
- **Environmental approval completed**



ALTECH CHEMICALS



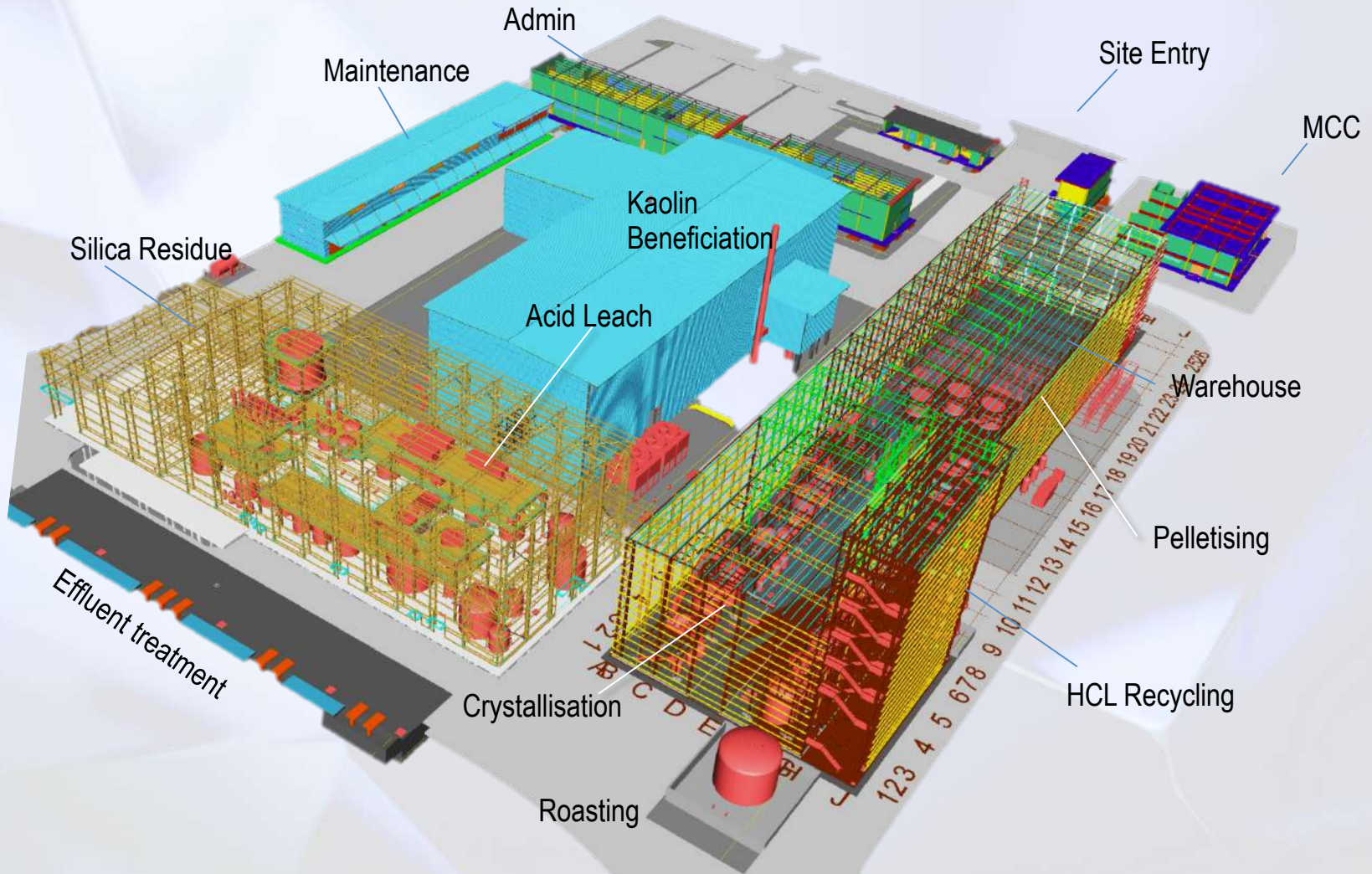
**HPA Plant to
be in Johor,
Malaysia**





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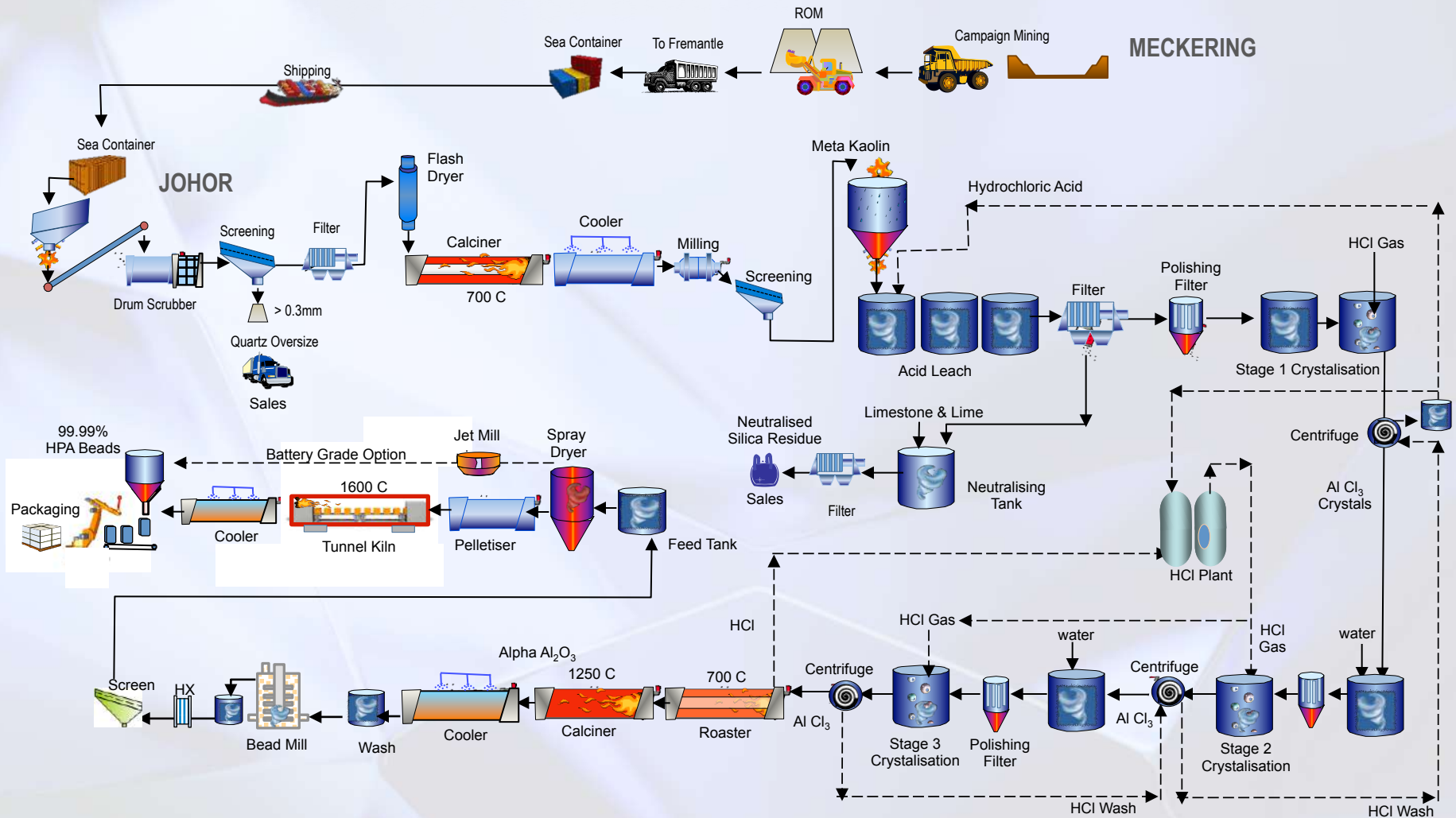
Johor HPA Plant





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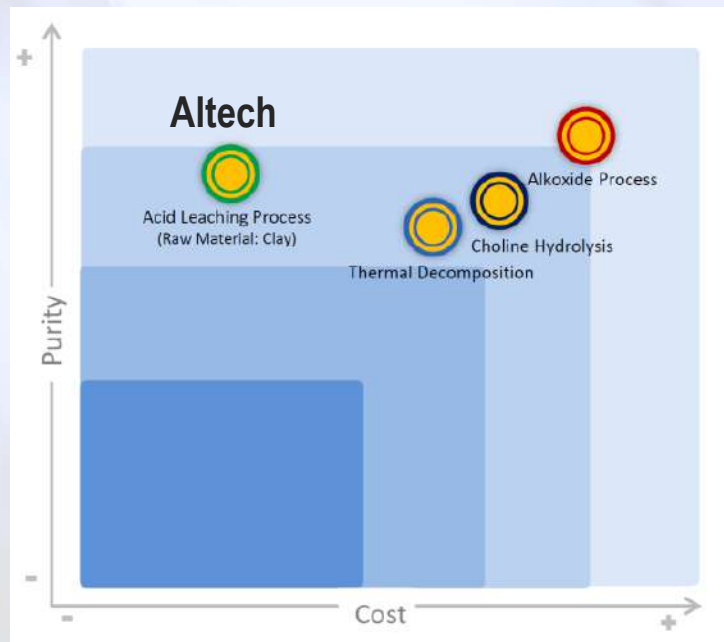
- **Current HPA price in Japan - US\$ 40.0/kg**
- **Pre-tax NPV_{7.5} US\$ 1.1 billion**
- **Internal Rate of Return (IRR) 33%**
- **Payback (full rate) 2.2 years**
- **EBITDA US\$ 133 million p.a.**
- **Production Costs - US\$ 10.50/kg**
- **Sale Price - Gross Margin – 74%**

Current 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
10 year
off-take



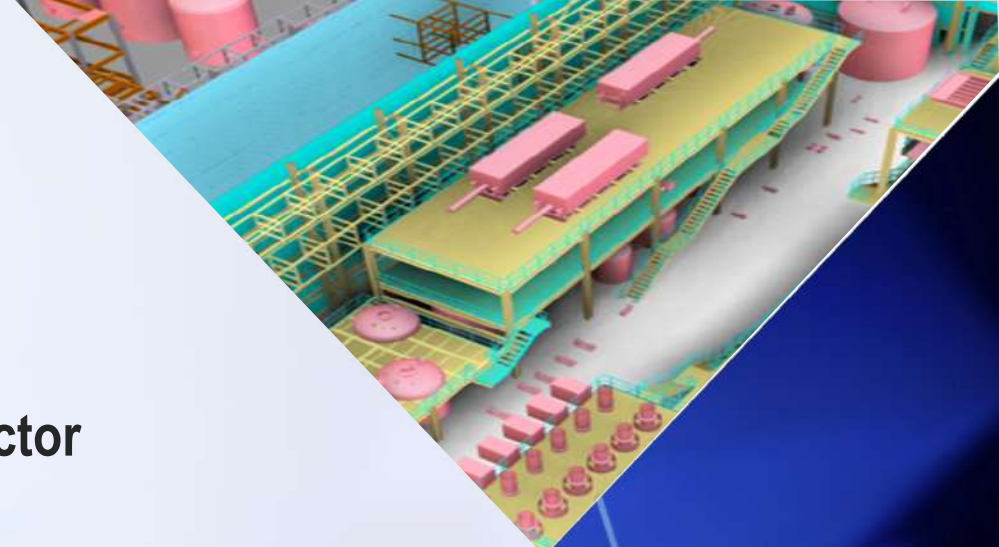


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- **SMS group German EPC contractor**
- **Lump sum turn key contract**
- **Completion and cost risk**
- **Throughout guarantee**
- **Process & quality guarantee**
- **Third largest user of ECA finance**
- **Committed US\$ 15 mil equity contribution**

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

**Debt
Funding
Successful**





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Three work streams

1) Subordinated mezzanine debt

- Target US\$120m

2) Equity work stream

- Equity investment partners
- Lead - Petra Capital

3) Possible JV Partner

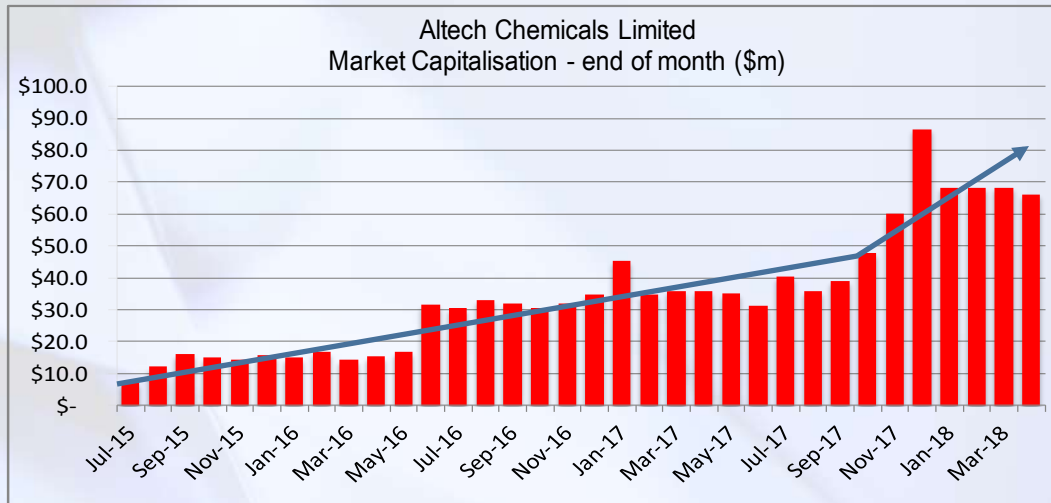
- Partial project sell down
- Maximises shareholder returns and minimises dilution



**Advancing
Final Stage
Funding**



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- **10 x steady market cap growth (3 years)**
- **Ave trade value \$2k/day to \$350k/day**
- **350% increase in shareholders to 2,500**
- **\$7 m cash end March 2018, no debt**
- **426 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

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.