

Altech Chemicals Limited ASX: ATC FRA:A3Y

Company Presentation

**Iggy Tan
Managing Director**



**Altech Chemicals
Limited**



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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 a problem for sapphire and lithium batteries

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
US\$9,000 per t



**High Purity
Alumina**
HPA 99.99% (4N)
US\$27,000 per t
US\$40,000 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

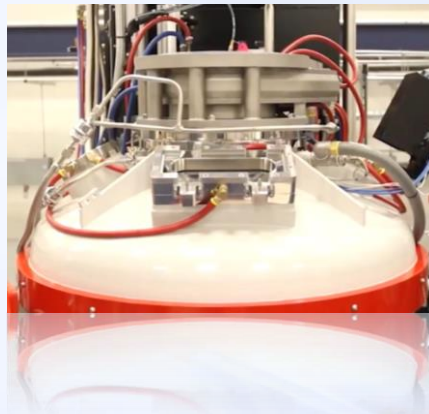
**High price
for purity**



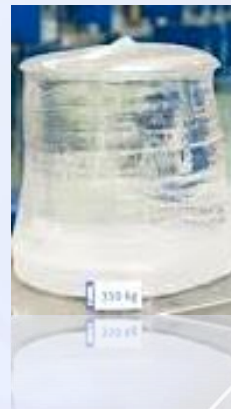
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LEDs & LITHIUM-ION BATTERIES

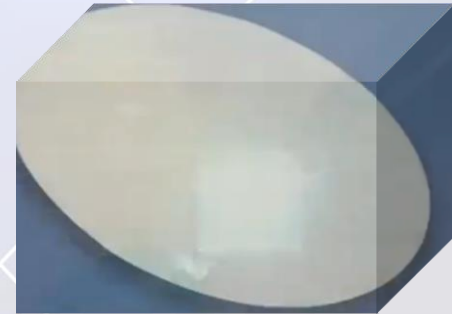
Sapphire Furnace (2,000 °C)



Sapphire Crystal Boule



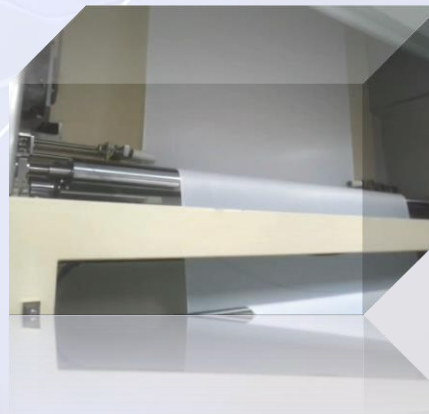
Sapphire Wafer LEDs



Nano Powder



Separator Coatings



LITHIUM ION
BATTERIES





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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

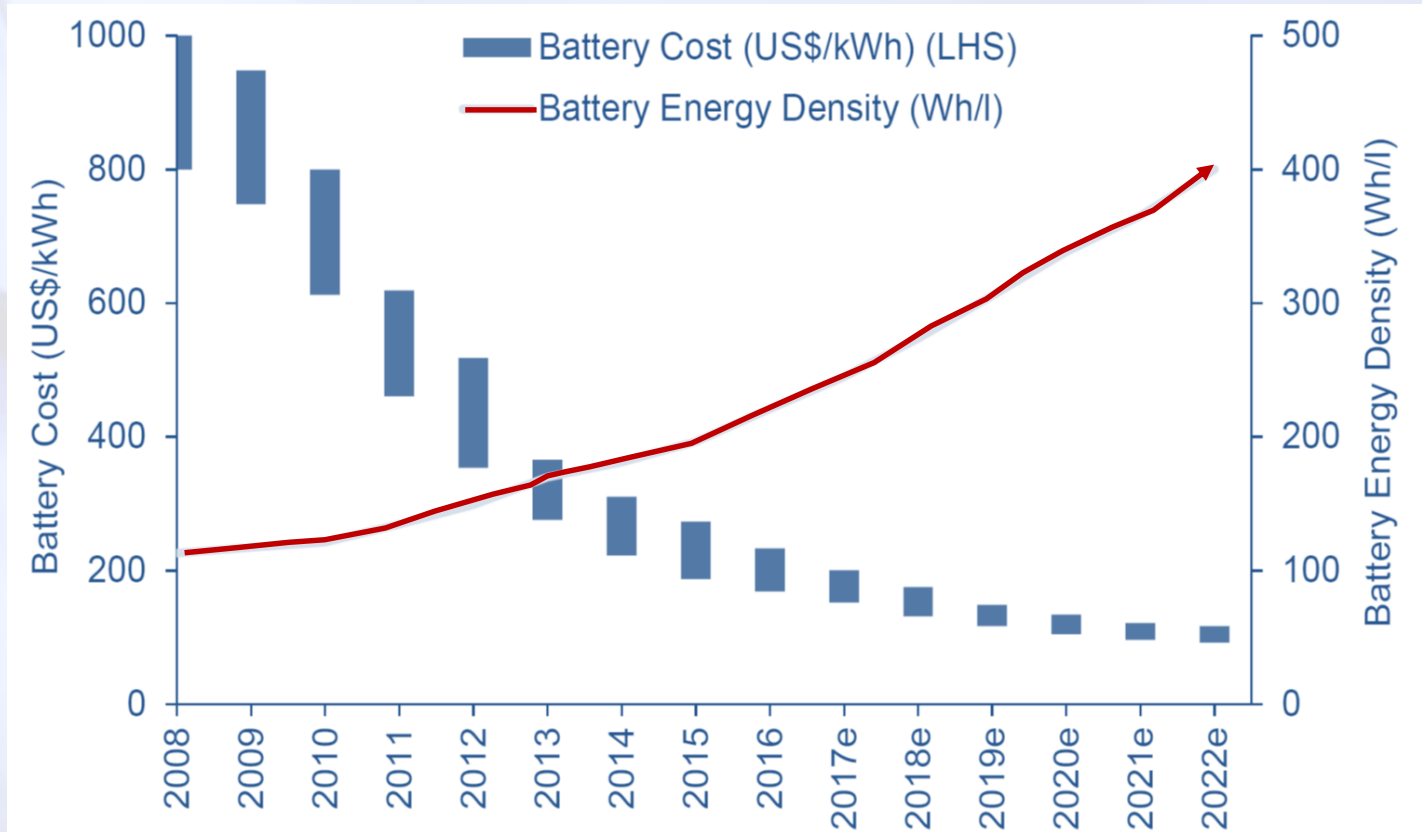
Energy Efficient Lighting Market Rising at a CAGR of 13.4% from 2016 to 2024, will reach to US\$15 bn by 2024



Xiamen Changelight Purchases AIXTRON MOGVD Technology to Expands ROY LED Production



Battery Energy Density

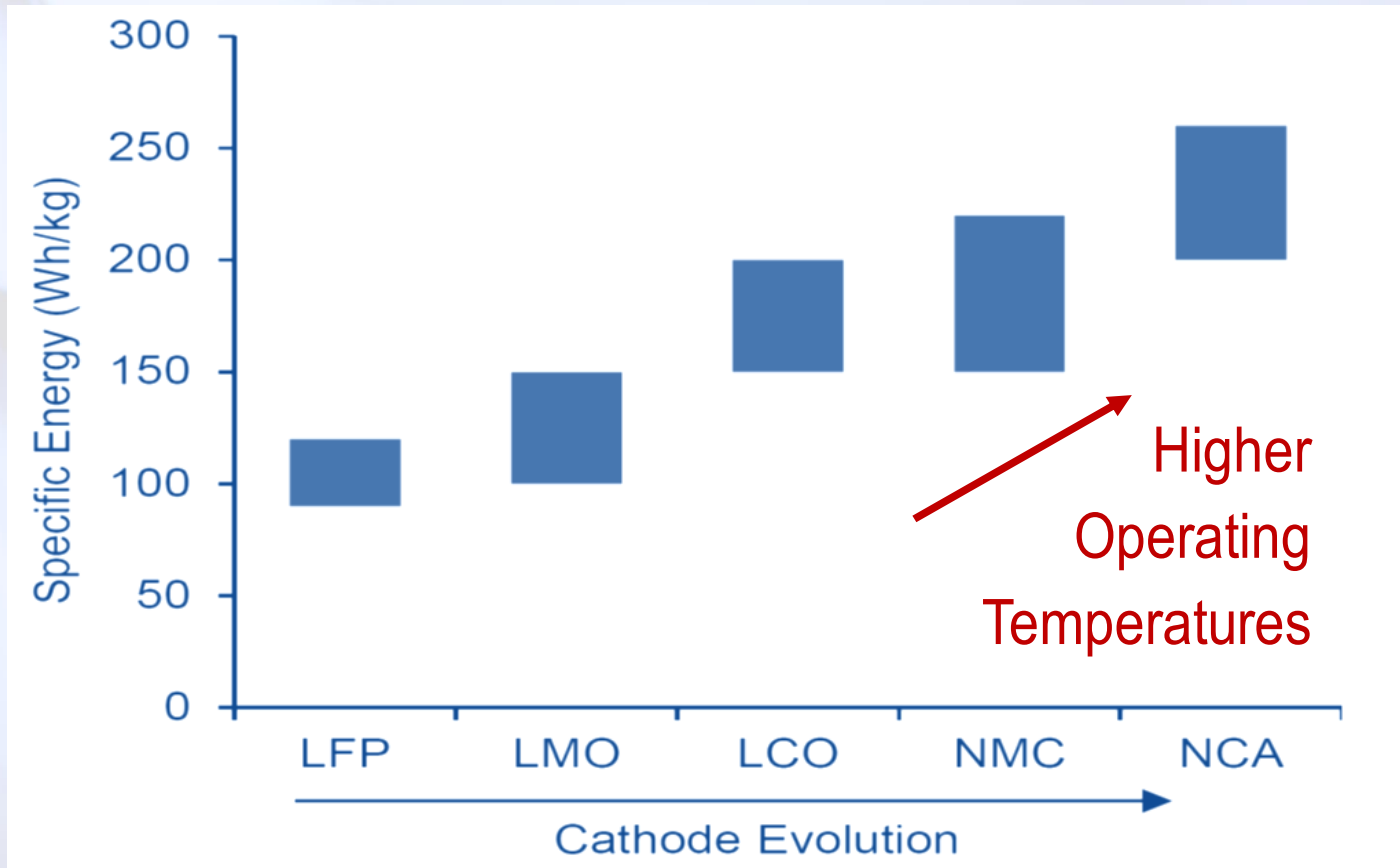


Battery costs are reducing due to increased energy density



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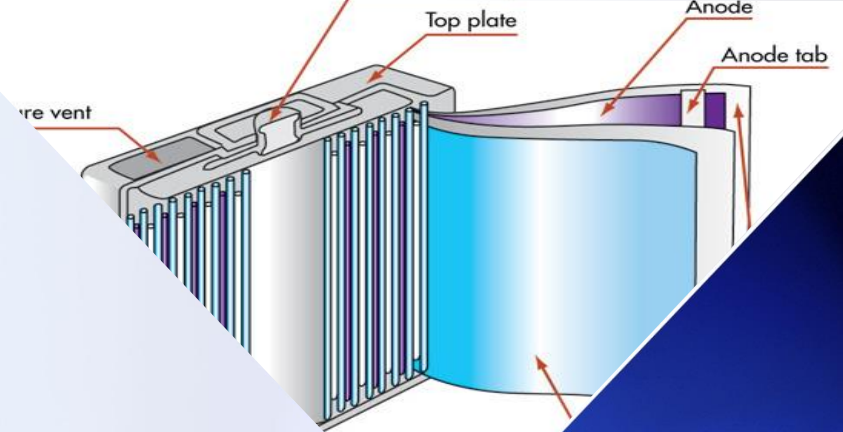
Battery Energy Density vs Temp



Cathode changes – higher operating temperatures

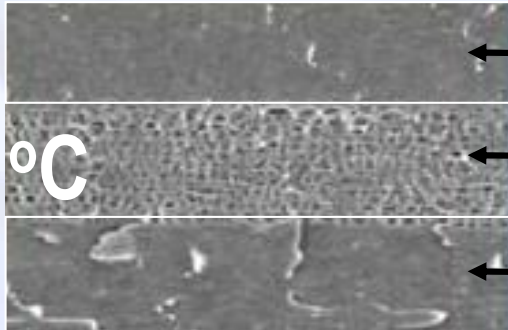


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Normal Polymer Separators

<135 °C

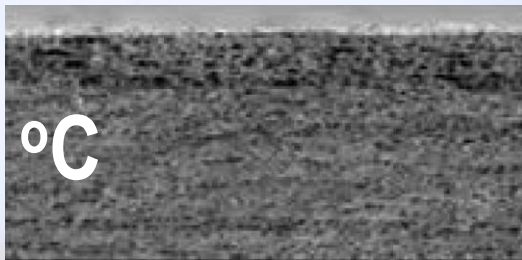


← Polypropylene (PP) 155 °C

← Polyethylene (PE) 135 °C

← Polypropylene (PP) 155 °C

>200 °C



← HPA layer

← Polymer membrane

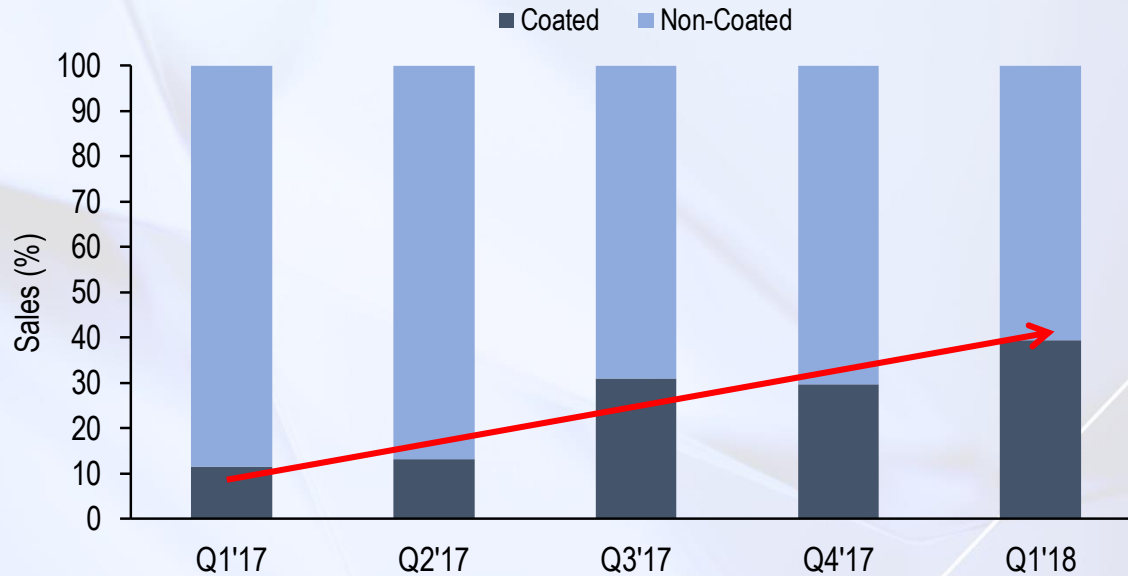
HPA Coated Separators (HPACS)

HPA
required
for higher
temps



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W Scope Sales Data



**HPA
Coated
Separators**



**Japanese separator manufacturer reports
40% HPA coated separators
11% only 12 months ago**



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Battery Separator Expansions

JAPAN-UPDATE

Asahi Kasei pours extra \$268m into battery separator production

Electric car demand and Chinese rivals spark upgraded investment plans

BUSINESS

Toray to lift South Korean capacity for battery material

Growing demand for electric vehicles seen justifying \$300mn investment

BUSINESS

W-Scope boosting separator output in South Korea

October 14, 2015 23:24 JST

BUSINESS TRENDS

Japan's materials makers see gold in fast-changing auto sector

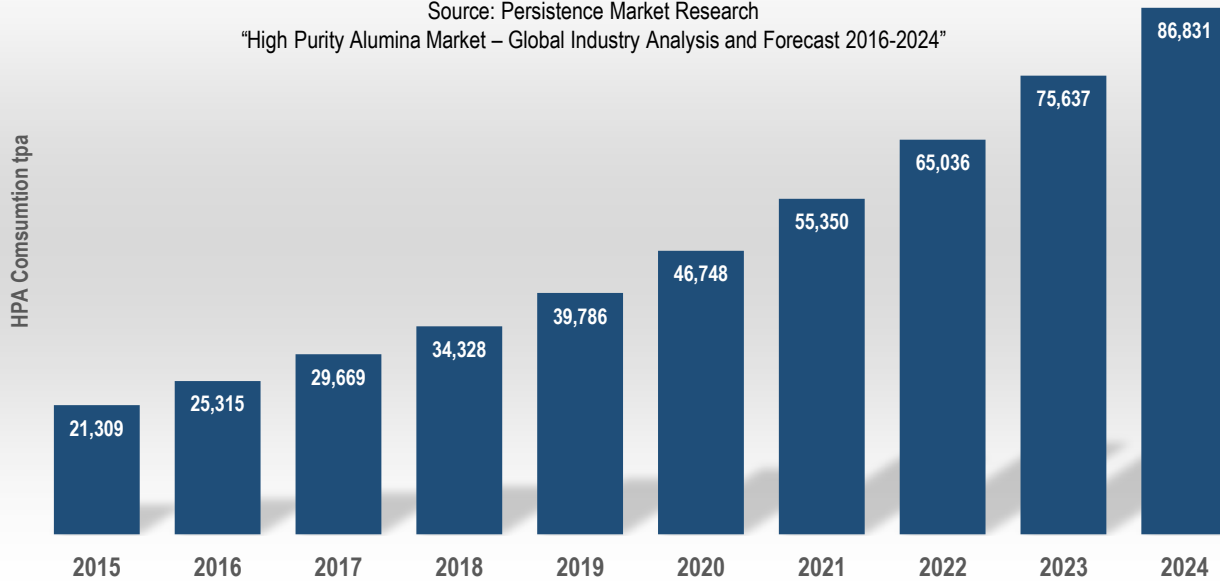
Mitsui Chemical, Asahi Kasei and peers tap expertise in car parts design



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Global High Purity Alumina Forecast 2016 -2024

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



**Demand
for HPA**

- 13 times ATC's 4,500 tpa 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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Organisation	Separator HPA Demand Forecast 2025 (tpa)	Equivalent Number of Altech HPA Plants
Altech Chemicals	15,102	3.4 x
Petra Capital (mid case)	37,500	5.1 x
CRU Consulting	76,000	16.9 x
Average	38,034	8.5 x

**Other
Separator
Forecast
2018**

- 1.6 kg HPA (US\$100) for average EV car (40 KWh)
- CRU most bullish on separator HPA growth
- Ave forecast of 38k tpa HPASC by 2025 (8.5 times ATC plant)



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Organisation	Total HPA Demand tpa 2025	Equivalent Number of Altech Plants
Persistence	62,519 tpa	14 x
Petra Capital	122,000 tpa	27 x
CRU Consulting	92,900 tpa	20 x
Average	92,473 tpa	20 x

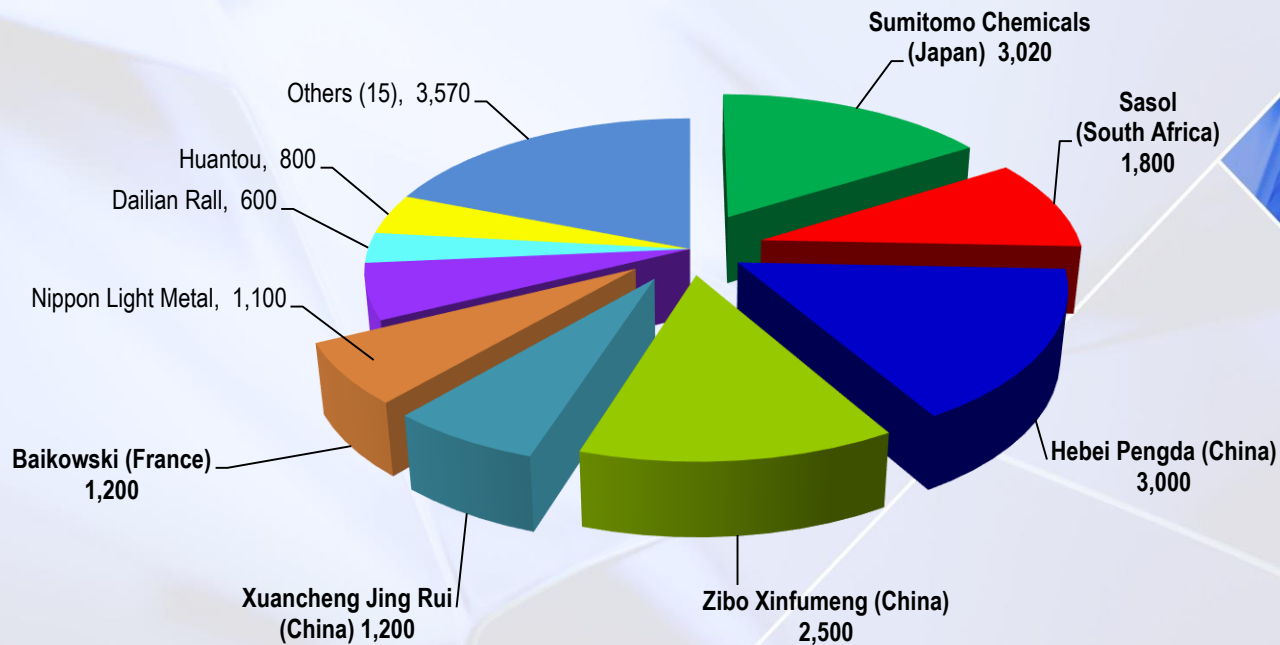
**Total HPA
Forecast
(inc LEDs)
2018**

- **Ave forecast of 92 k tpa by 2025 (20 times ATC plant)**
- **No incumbent expansions announced**
- **New entrants 4-5 years behind**
- **Demand will outstrip supply**



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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



- **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**

**Low-Impurity
Kaolin Feedstock**

Altech's kaolin deposit



%	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
- 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**
- **60% lower operating costs**
- **HCl plant nearby**
- **Services, natural gas, electricity, water**
- **Access to 17th largest container port**
- **5-10 year corporate tax free**
- **No radioactive waste – chemical park**



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

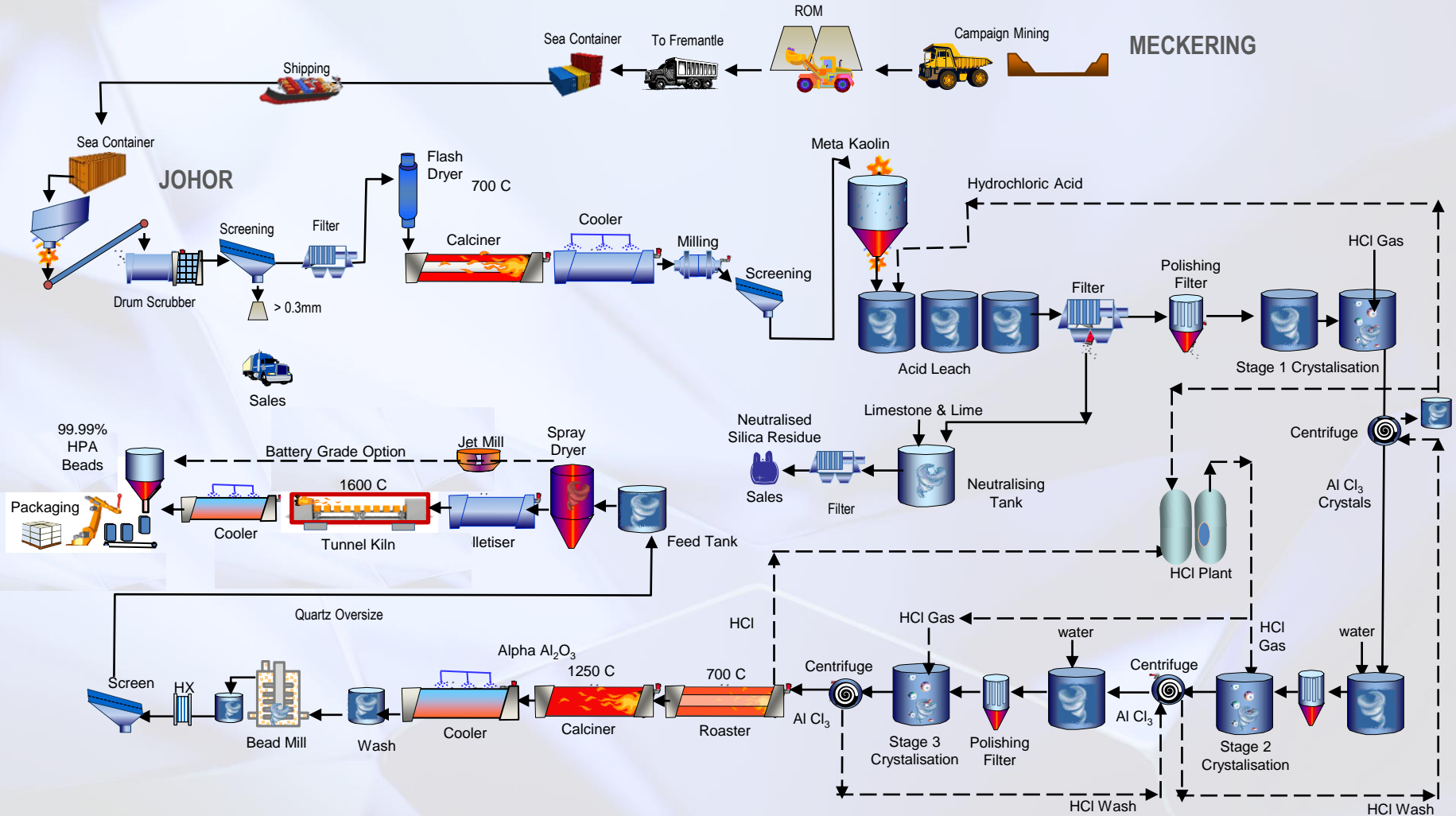






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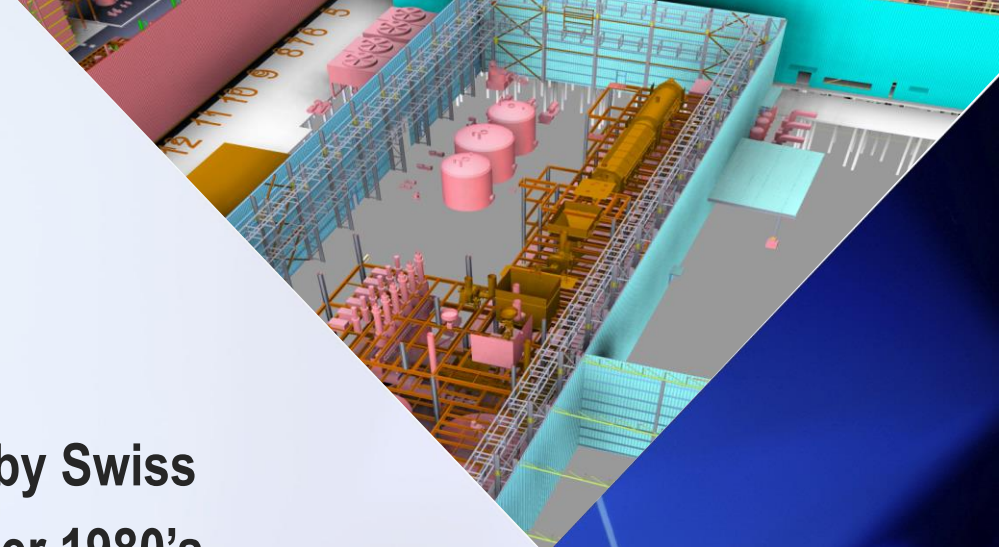
Altech's HPA Process





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- **Chemistry established in 1900s by Swiss**
- **US Gov & Alcoa developed further 1980's**
- **No demand for HPA in 1980's**
- **New HPA growth demand (LEDs LIBs)**
- **Altech applied open chemistry to Meckering**
- **Very successful, disruptive, lowest cost**
- **One patent granted, one pending for process**
- **New entrants - possible breach of Altech patents**



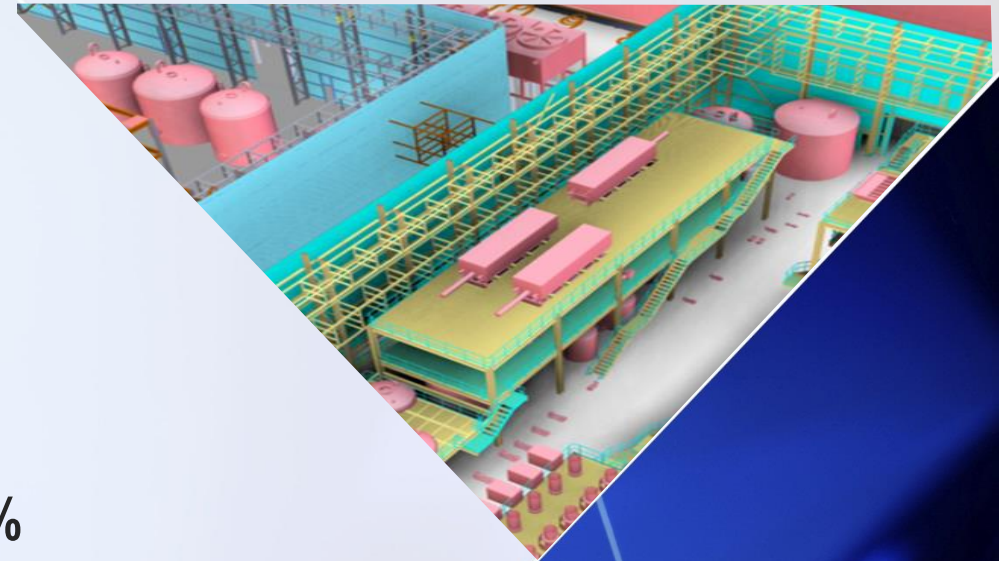
**Established
Proven
Chemistry**



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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%**

**Conservative
Bank
Model**





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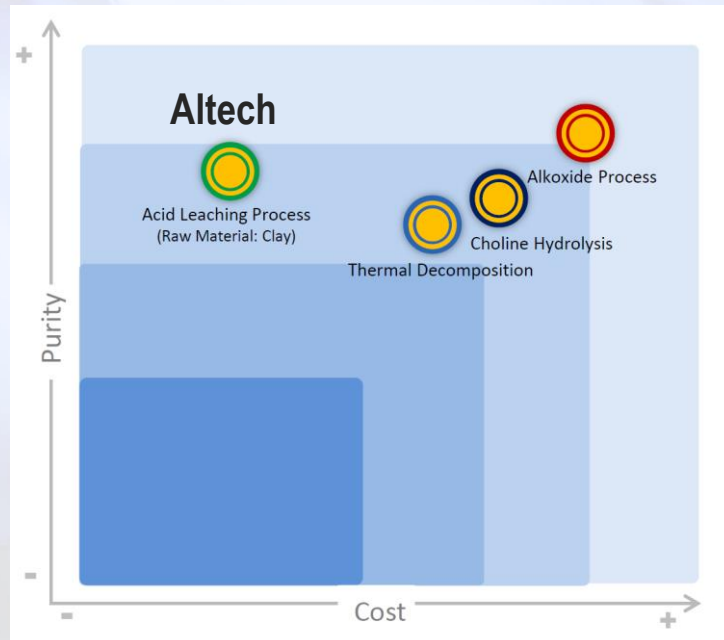
- **Current price in Japan - US\$ 40.0/kg**
- **Pre-tax NPV_{7.5} US\$ 1.1 billion**
- **Internal Rate of Return (IRR) 33%**
- **Payback (full rate) 2.2 years**
- **Capital cost US\$ 298 million**
- **EBITDA US\$ 133 million p.a.**
- **Production Costs - US\$ 10.50/kg**
- **Sale Price - Gross Margin – 74%**

Current Case Economics



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- **Competitors**
 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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 **Mitsubishi Corporation**



- **Off-take sales agreement with Mitsubishi**
- **First 10 years of HPA operations**
- **Secures sales for HPA plant production**
- **Exclusive buyer and seller**
- **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**
- **Throughput guarantee**
- **Process & quality guarantee**
- **Third largest user of ECA finance**
- **Committed US\$ 15 mil equity**

SMS  **group**

**Lump Sum
Turn Key
Contract**





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- Lab work completed
- Batch pilot plant completed
- SMS 8 years of independent lab/pilot work
- Conservative design assumptions
- Using 79% instead 90% Utilisation
- Using 60% instead 90% Recovery
- Using 30% instead 34% Al_2O_3 feed grade
- 3 Yr ramp up instead of 2 Yr
- Possibility of 6,000 tpa

**Aiming to
Under-promise
Over-deliver**



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- Senior debt funding with KfW IPEX-Bank
- Total senior 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



**Senior Debt
Funding
Completed**



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Three work streams

1) Subordinated mezzanine debt

- Term sheet received of US\$90 m
- Stream term sheet of US\$60m

} Subject
to Due
Diligence

2) Equity work stream

- Lead - Petra Capital Raised A\$21.4m

3) Possible JV Partner

- Partial project sell down

**Advancing
Final Stage
Funding**



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Status of Funding Initiatives

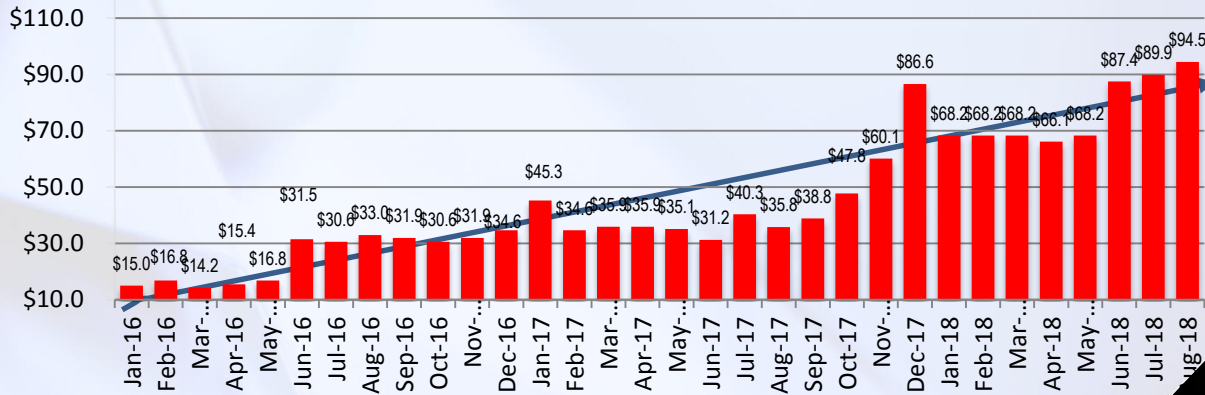
Facility	Financier	Amount	Status
Senior Loan	KFW-IPEX Bank	US\$ 190 million	Committed
Mezzanine Loan*	Global Merchant Bank	US\$ 90 million	Indicative Term sheet
Stream Finance*	Global Investment Group	US\$ 60 million	Indicative Term sheet
Total		US\$ 340 million	

- Mezz and Stream term sheets – indicative non-binding
- Subject to lenders due diligence



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Market Capitalisation - end of month (\$m)



**Altech
Growth
Performance**

- 14 x steady market cap growth (4 years)
- Ave trade value \$2k/day to \$350k/day
- 480% increase in shareholders to 3,500
- Mar Cap \$95m - 572 m shares
- Cash - \$14 m

ASX

- **A\$ 21 million raised**
- **Stage 1 construction commenced**
- **Construction concurrent with debt finance close**
- **Site clearance completed**





Altech Chemicals Sdn Bhd

GRAND OPENING CEREMONY

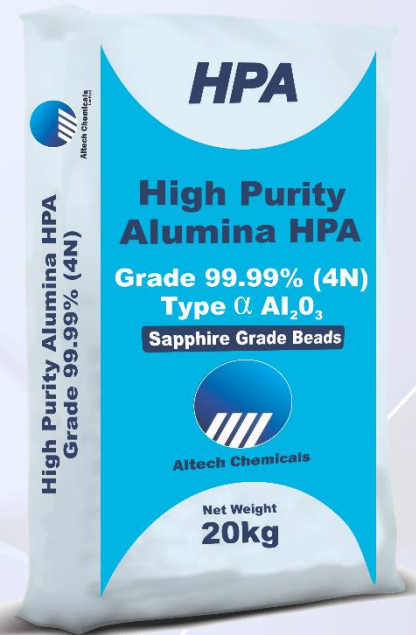
8TH AUG 2018





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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.

The mezzanine debt and stream finance facility term sheets referred to in this ASX announcement are both indicative in nature; are non-binding; and contain the general terms of proposed transactions. Any future commitment for either facility will be subject to and is contingent upon all internal approvals of the financial institution as well as the completion of detailed due diligence (including but not limited to legal and technical due diligence) and legally binding documentation and senior lender agreement. There is no certainty that the mezzanine project debt or stream finance will be approved or a transaction concluded based on what is contemplated in the term sheet. The Company makes no representations or warranties whatsoever as to the outcome of the mezzanine debt or stream finance process.

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.