



3 July 2019

CRU UPGRADES BASE-CASE DEMAND FORECAST FOR 4N+ HPA TO 17.9% CAGR, 2018-28

Highlights

- CRU high purity alumina (HPA) market outlook report received
- Known HPA supply will be unlikely to support full demand growth, limiting growth to 17% CAGR from maximum potential growth of 30% CAGR (2018-2028)
- LED market will require higher quality HPA, rather than low-cost supply
- Based on CRU's 4N+ HPA price forecast, Altech's project NPV increases by 32% to US\$669m
- Project EBITDA increases from US\$76m to US\$100m p.a.

Altech Chemicals Limited (Altech/the Company) (ASX: ATC) (FRA: A3Y) is pleased to advise that it has now received a copy of the high purity alumina (HPA) market outlook report prepared by CRU Consulting (CRU).

Strong 4N+ HPA Demand Growth Forecast

The unconstrained demand forecast for 4N+ (99.99% or greater) HPA, the market segment that Altech's plant is designed to supply, is significantly stronger than CRU had forecast in its previous market report, completed in 2018. The previous 4N+ HPA demand was estimated at 92,900 tonnes by 2025. In its recent market report, CRU estimated 4N+ HPA could in theory grow at 30% p.a. from 19,000 tonnes p.a. (2018) to 272,000 tonnes (2028), but that this growth will be constrained by limited supply availability and that a spike in HPA prices would likely result from a large-scale deficit.

CRU estimates that the market for HPA in powder form used in lithium-ion battery separators could reach 187,000 tonnes p.a. by 2028 if sufficient supply were available – noting that Altech's planned 4,500 tonne p.a. of production would only be small part of this. Meanwhile, HPA in the pellet/bead form used in light emitting diodes (LEDs) is forecast to reach 85,000 tonnes p.a. by 2028, and is expected to exhibit greater price inelasticity, since synthetic sapphire is by far the most widespread substrate material used in the solid-state lighting industry.

In explaining its 4N+ HPA market growth forecast, CRU stated that:

- the demand for ceramic coated separators (CCS) in lithium-ion battery (LIB) applications is genuine and will rapidly proliferate, as more energy-dense batteries arrive to serve the surging electric vehicle (EV) market;
- manufacturing trends in LED production – which itself has an excellent growth trend – have recently moved in favour of larger sapphire wafers, which will have profound (positive) consequences for the

4N+ HPA market – the push for defect-free 6” and 8” wafers will drive demand for higher purity HPA feedstock; and

- CRU commented positively on Altech’s plan to produce HPA in either pellet or powder form, stating that Altech “*should be able to adapt its product mix to meet developments in the market, allowing it to maximise its ability to place all of its output once it begins operating, and to target the industry offering the highest purchase prices*”.

HPA – Consistent Quality is Key

In its quality commentary, CRU reported that historically the major suppliers of 4N+ HPA have been *Sumitomo* and *Nippon Light Metal* in Japan, *Baikowski* in France and the US, and *Sasol* in the US and Germany. In recent years, Chinese production has increased markedly, but product quality is variable and much of it is below that of the established producers – typically at the 99.9-99.99% level, and thereby falling into the “cost-conscious” segment of the HPA market (smaller LED wafers and sub-optimal LIB separators).

The CRU report cites anecdotal evidence from numerous market participants that separator manufacturers are actively seeking out high quality HPA for their coatings, although much lower-cost HPA (i.e. 3N) is also supplied into the CCS market. CRU’s analyst team accept the rationale that increased HPA purity has a number of positive effects – greater potential life cycle of the lithium-ion battery cell, and a reduced chance to build up dendrites that compromise the safety the cell (which is of special concern to EVs). In LIB CCS applications, any sodium (Na) and iron (Fe) impurities carried through to finished product HPA are particularly concerning to consumers, since the former interferes with the uptake of lithium ions, and the latter is magnetic and contributes to the build-up of dendrites.

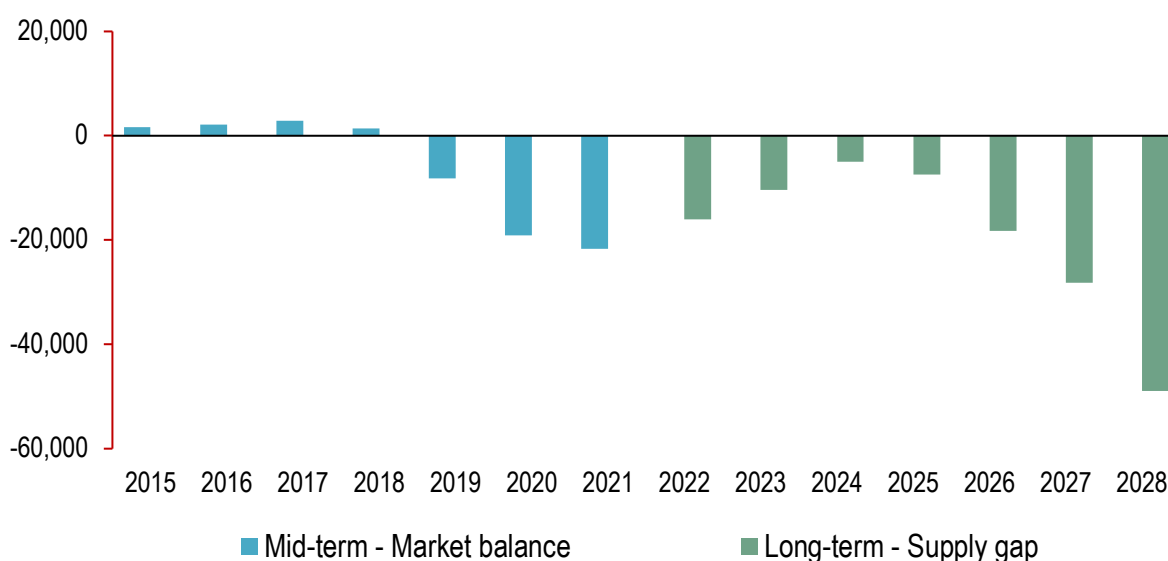
Significant HPA Supply Shortfall

In estimating the future 4N+ HPA demand and supply balance, CRU took into account all projects approaching or at pre-feasibility stage, as well as announcements for any planned changes in production from existing producers. CRU noted the expected capacities put forth by these companies and filtered them through their standardised Project Gateway Methodology, to arrive at reasonable assumptions for the ultimate volumes of HPA supplied to the market by the new entrants and existing producers, as well as the timing of such supply.

Even after constraining the modelled demand profile to reflect a forced move towards 99.9% alumina in the LIB CCS market (for all but the most demanding EVs) because of the forecast shortfall of 4N+ HPA supply, the report concluded an impending significant market deficit, where supply – even in a very optimistic scenario – could not keep pace with the level of 4N+ HPA demand. The results of the constrained analysis show a large apparent 4N+ HPA short term deficit (blue bars in Figure 1) that is briefly alleviated by Altech and a number of announced HPA hopefuls in the 2022-24 period, before the supply gap begins to increase again in 2025f (green bars in Figure 1, below), reaching ~50,000 tonnes p.a. of shortfall by the end of the forecast period (2028).



Figure 1 CRU base case market balance and supply gap for 4N+ HPA, 2015-2028, tonnes



Impact of CRU Forecasts on Altech's Final Investment Decision Study

In its market outlook report, CRU provided a long term price forecast (2022-2028), which is higher than what had been adopted by Altech in its Financial Investment Decision Study (FIDS) model. CRU's prices begin to rise from 2020 due to the expected market deficit, further supported by anticipated increases in production costs.

Adopting CRU's price forecast, Altech has calculated that the average annual sales revenue for its 4,500tpa HPA project would increase from US\$120 million to US\$144 million p.a.. The discounted cash flow or net present value (NPV) would increase by 32% from US\$505 million to US\$669 million and the EBITDA at the full production rate would increase by 31%, from US\$76 million to US\$100 million p.a..

Table 1 – Impact of CRU Forecast Price on Altech's FIDS model

FIDS incorporating CRU price forecast		Original FIDS	
HPA Production	4,500 tonnes	4,500	tonnes
Exchange Rate	0.75 USD/A\$	0.75	USD/A\$
Project Capex (US\$)	\$297.6 million	\$297.6	million
Corporate Costs (US\$)	\$7.7 million	\$7.7	million
NPV (US\$)	\$668.6 million	\$505.6	million
Discount Rate	7.5%	7.5%	
IRR	23.1%	21.9%	
Revenue p.a. (US\$)	\$144.3 million	\$120.3	million
Costs p.a. (US\$)	\$44.6 million	\$44.6	million
EBITDA p.a. (US\$)	\$99.7 million	\$75.7	million
Cost of production* (US\$)	\$8.56 per kg	\$8.56	per kg
Margin %	73%	68%	

* excludes selling costs

For more information, please contact:

Corporate

Iggy Tan

Managing Director
Altech Chemicals Limited
Tel: +61 8 6168 1555
Email: info@altechchemicals.com

Shane Volk

Company Secretary
Altech Chemicals Limited
Tel: +61 8 6168 1555
Email: info@altechchemicals.com

Investor Relations (Europe)

Kai Hoffmann

Soar Financial Partners
Tel: +49 69 175 548320
Email: hoffmann@soarfinancial.com
Wir sprechen Deutsch.

About Altech Chemicals (ASX:ATC) (FRA:A3Y)

Altech Chemicals Limited (Altech/the Company) is aiming to become one of the **world's leading** suppliers of **99.99% (4N) high purity alumina (HPA)** (Al_2O_3).

HPA is a high-value, high margin and highly demanded product as it is the critical ingredient required for the production of synthetic sapphire. Synthetic sapphire is used in the manufacture of substrates for LED lights, semiconductor wafers used in the electronics industry, and scratch-resistant sapphire glass used for wristwatch faces, optical windows and smartphone components. There is no substitute for HPA in the manufacture of synthetic sapphire.

Global HPA demand is approximately 25,315tpa (2016) and demand is growing at a compound annual growth rate (CAGR) of 16.7% (2016-2024), primarily driven by the growth in worldwide adoption of LEDs. As an energy efficient, longer lasting and lower operating cost form of lighting, LED lighting is replacing the traditional incandescent bulbs.

Current HPA producers use expensive and highly processed feedstock materials such as aluminium metal to produce HPA. Altech has completed a Final Investment Decision Study (FIDS) for the construction and operation of a 4,500tpa HPA plant at the Tanjung Langsat Industrial Complex, Johor, Malaysia. The plant will produce HPA directly from kaolin clay, which will be sourced from the Company's 100%-owned kaolin deposit at Meckering, Western Australia. Altech's production process will employ conventional "off-the-shelf" plant and equipment to extract HPA using a hydrochloric (HCl) acid-based process. Production costs are anticipated to be considerably lower than established HPA producers.

The Company is currently in the process of securing project financing and has announced the execution of an agreement with its appointed EPC contractor SMS group for the commencement of Stage 1 construction of its HPA plant in Johor, Malaysia.



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 the 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.