Alpha HPA

ASX: **A4N**
ASX Announcement
23 March 2023
(4 pages)

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AGREEMENTS TO ENTER SAPPHIRE GLASS PRODUCTION WITH EBNER GROUP

- **Agreements reached with global industrial furnace company Ebner Industrieofenbau GmbH ('Ebner') and Ebner subsidiary Fametec GmbH ('Fametec') to enter the HPA related downstream production of synthetic sapphire glass.**
- **Sapphire glass is the dominant global end-use of premium quality (>99.995%) high purity alumina (HPA) used in LED lighting, optics and consumer electronics.**
- **Ebner-Fametec have developed an advanced sapphire glass growth technology, with improved economic yield and lower energy requirements than incumbent technologies.**
- **Alpha and Ebner-Fametec have been collaborating on sapphire glass growing and testing using Alpha's HPA products since mid-2022.**
- **Agreements structured to facilitate a staged entry into sapphire glass growth of up to 100 sapphire glass growth units.**
- **Entry into sapphire glass growth optimally timed due to significant supply disruption and increasing micro-LED demand.**
- **Downstream investment into sapphire glass production considered a logical and value-adding complement to the HPA First Project.**
- **Conversion of HPA to sapphire glass represents an estimated 10x value uplift per alumina unit.**

The Board of Alpha HPA Limited ('Alpha' or 'the Company') is pleased to provide an update on project activities for its HPA First Project, representing the commercialisation and production of critical high purity aluminium products driving de-carbonisation.

The Company's Stage 1, Precursor Production Facility (PPF) in Gladstone, QLD is in production for 5N purity aluminium nitrate precursors with an expansion underway to produce Alpha's full product offering.

The Company is concurrently satisfying the remaining conditions precedent to the full-scale Project Final Investment Decision (FID), with a focus on product sales, offtakes and project financing.

Agreements Summary

Alpha and Ebner Industrieofenbau GmbH ('Ebner') and Ebner subsidiary Fametec GmbH ('Fametec'), Ebner-Fametec have held discussions since mid-2022 on potential co-operation between the companies on the commercial roll-out of Ebner-Fametec's sapphire growth technology utilising HPA feedstock material from Alpha.

Following a process of mutual due diligence, mutual site visits and production testing of sapphire glass growth utilising Alpha's custom high purity alumina (HPA) tablets in Ebner-Fametec's sapphire growth units, the parties have signed a series of agreements providing for a staged entry by Alpha into the production of synthetic sapphire using Alpha's HPA feed material, with a specific focus on supplying the LED lighting sector.

The agreements include the following:

- Commercial and Technical proposals
- Technology Licence Agreement
- Letter of Intent (LOI)

Together the agreements provide for the purchase by Alpha of an initial 2 crystal growth units for installation into the Stage 1 PPF in Gladstone (**Phase A**). With assistance from Ebner-Fametec, these units will be used to qualify Alpha's sapphire with selected end-users, in addition to establishing its ultra-high purity HPA tablets as a premium raw material feed to downstream end-user markets.

The Phase A investment for the purchase, installation and commissioning of the initial 2 growth units including supporting utility connection costs (water, gas, E&I) is estimated at ~AUD$3.4M.

Delivery of the initial growth units is expected in January 2024, with sapphire qualification anticipated by July 2024. Under the Licensing Agreement and LOI, Ebner-Fametec will provide technical oversight during the installation, commissioning and qualification phase.

On successful qualification under Phase A and subject to approval by Alpha's Board, the LOI also contemplates an expansion to up to 100 growth units by the end of 2025 in two further stages (**Phase B and C**).

Phase B consists of a further 48 growth units and Phase C consists of a further 50 growth units on commercially agreed terms. The investment will be made by an Alpha 100% owned subsidiary, with the location of the Phases B and C roll-out to be determined, based on an assessment of the most favourable logistics, including access to renewable energy.

About Ebner-Fametec

Fametec is a private Austrian based subsidiary of the Ebner Group that has developed a proprietary crystal growth technology to produce sapphire crystals in multiple shapes, with a special focus on larger-sized sapphire crystals.

Fametec's crystal growth process, known as the McSAP (Multi c-Axis Sapphire) method has been developed over 10 years and with estimated R&D expenditure of over €20M. C-axis sapphire crystal growth is able to achieve ~80% utilisation of the crystal boule (compared to ~35-40% for current industry standard A-axis crystals) with ~50% power saving (per kilogram of utilised crystal) realised through greater utilisation per crystal boule and growth of multiple boules per production run, realising a materially lower carbon footprint than other crystal growth processes.

Fametec's vision is to supply large-size sapphire substrates that are 'green' sapphire, grown using 100% sustainable energy sources. Fametech's 'green' sapphire is significantly more energy-efficient, of higher quality, and priced more competitively for use in micro-LED, power and optical applications.

Ebner Industrieofenbau GmbH ('Ebner') Group is a large family owned Austrian manufacturer with over 70 year history in the design and construction of industrial furnaces for the heat treatment of metals. Ebner is a global market leader in numerous application areas and has over 1400 employees with production sites in Europe, Asia and USA. Ebner has been active in R&D development and commercialisation activities in the field of LED's and semiconductor materials since 2005.

Sapphire Industry Dynamics and Investment Rationale

Synthetic sapphire glass is produced from premium purity HPA feedstock in bespoke, high technology growth furnaces.

After an extended period of investigation into the sapphire glass market and manufacturing process, Alpha has identified this as a unique opportunity to partner with a world class company and innovator and capitalise on a significant value adding downstream use of its HPA product.

Traditionally, Russian and Chinese companies have dominated the industry, accounting for >80% market share however there is now growing reluctance from Western customers to purchase Russian product, most notably from the world's current largest sapphire glass supplier, Russian company Monocrystal (estimated to represent 25-40% of global sapphire production).

Other factors constructive to Alpha's entry into the sapphire market include:

- **Sapphire glass is a direct consumer of HPA** - an established presence in this market is likely to drive an upstream demand for Alpha's ultra-high purity alumina tablets;
- **Attractive, high-growth, end-user markets** - a broadening array of Western customers is driving demand for low carbon intensity synthetic sapphire, particular across the future-facing micro/mini LED and high-end optics markets.
    - LED – underpinned by mini/micro LEDs designed for optimal picture quality and energy efficiency. The mini and micro LEDs markets are predicted to grow to US$17 bn by 2026, with wafer demand for micro LEDs forecast to grow at a CAGR >500% between 2023-2027 (*source MarketWatch Inc*).
    - 'Optics' – including watch faces, sapphire windows, phone lens covers, specialised medical applications and defence applications. The optics market generally attracts a price premium and is more demanding in sapphire quality in terms of clarity and colour. The sapphire optics market size is estimated to be $900m, growing at 18% p.a.
- **Attractive economics** - conversion of HPA to sapphire glass is estimated to represent a value uplift of **~10x** per unit of alumina with sapphire growth capturing an estimated 50% greater cash flow margins than producing HPA and precursors.
- **An intensifying global trend towards re-shoring/friend-shoring supply chains**.
- **A growing necessity to decarbonise supply chains to meet stringent emission targets**. With sapphire growth being an energy intensive process, Ebner-Fametec lower energy technology, combined with Alpha's ability to access renewable energy provides an attractive alternative to the higher carbon intensity of the current global sapphire glass producers.

Commenting on the Company's collaboration with Ebner-Fametec, Managing Director Rimas Kairaitis said:

"*The Company is delighted to announce this new collaboration arrangement with Ebner-Fametec. Having recognised the present supply dynamics in the sapphire growth market and the enormous growth potential for premium sapphire product across the LED and optics markets, Ebner-Fametec's proprietary crystal growth technology and established industry relationships makes them an ideal collaboration partner for Alpha. We see Alpha's intended entry into the downstream market segment as highly complementary to our existing operations and a unique opportunity to broaden our exposure to the sapphire glass industry supply chain.*

Both Alpha and Ebner-Fametec are committed to deploying new technology to realise higher quality materials in a more sustainable way.

This collaboration provides further endorsement of the quality of our HPA material and Alpha's capacity to construct and operate a high technology facility. The collaboration was also considerably assisted by the additional capacity being delivered through Alpha's deployment of the A$15.5M Australian Government CMDP grant.

We look forward to working with Ebner-Fametec in the period ahead to establish ourselves as a premium suppler of HPA and sapphire boule to this exciting market segment."

Sapphire crystal growing units at Ebner-Fametec's Austrian facility

About the HPA First Project

The Company's HPA First Project represents the commercialisation of the production of high purity alumina (HPA) and related high purity aluminium precursor products using the Company's proprietary licenced solvent extraction and HPA refining technology. The disruptive, low-carbon process technology provides for the extraction and purification of aluminium from an industrial feedstock to produce 4N (>99.99% purity) alumina and 5N (>99.999% purity) for sale into high technology markets including semiconductors, lithium-ion battery and LED lighting.

Alpha completed a Definitive Feasibility Study in March 2020 following a successful pilot plant campaign in 2019.

Alpha is now in production at its Stage 1, Precursor Production Facility which has now completed a successful commissioning and entered production ramp-up phase. The Stage 1 facility is also now being expanded to produce the full range of Alpha's high-purity materials with $15.5M grant funding from the Australian Government.

The Company is now in the mature phases of market outreach and project financing with respect to the full scale Stage 2 HPA First Project, with the expectation of positioning Stage 2 to Final investment Decision.

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