

AUSTRALIAN

RESEARCH

INDEPENDENT INVESTMENT RESEARCH

FYI Resources Limited (ASX:FYI)

December 2020

WHO IS IIR?

Independent Investment Research, "IIR", is an independent investment research house based in Australia and the United States. IIR specialises in the analysis of high quality commissioned research for Brokers, Family Offices and Fund Managers. IIR distributes its research in Asia, United States and the Americas. IIR does not participate in any corporate or capital raising activity and therefore it does not have any inherent bias that may result from research that is linked to any corporate/ capital raising activity.

IIR was established in 2004 under Aegis Equities Research Group of companies to provide investment research to a select group of retail and wholesale clients. Since March 2010, IIR (the Aegis Equities business was sold to Morningstar) has operated independently from Aegis by former Aegis senior executives/shareholders to provide clients with unparalleled research that covers listed and unlisted managed investments, listed companies, structured products, and IPOs.

IIR takes great pride in the quality and independence of our analysis, underpinned by high caliber staff and a transparent, proven and rigorous research methodology.

INDEPENDENCE OF RESEARCH ANALYSTS

Research analysts are not directly supervised by personnel from other areas of the Firm whose interests or functions may conflict with those of the research analysts. The evaluation and appraisal of research analysts for purposes of career advancement, remuneration and promotion is structured so that non-research personnel do not exert inappropriate influence over analysts.

Supervision and reporting lines: Analysts who publish research reports are supervised by, and report to, Research Management. Research analysts do not report to, and are not supervised by, any sales personnel nor do they have dealings with Sales personnel

Evaluation and remuneration: The remuneration of research analysts is determined on the basis of a number of factors, including quality, accuracy and value of research, productivity, experience, individual reputation, and evaluations by investor clients.

INDEPENDENCE – ACTIVITIES OF ANALYSTS

IIR restricts research analysts from performing roles that could prejudice, or appear to prejudice, the independence of their research.

Pitches: Research analysts are not permitted to participate in sales pitches for corporate mandates on behalf of a Broker and are not permitted to prepare or review materials for those pitches. Pitch materials by investor clients may not contain the promise of research coverage by IIR.

No promotion of issuers' transactions: Research analysts may not be involved in promotional or marketing activities of an issuer of a relevant investment that would reasonably be construed as representing the issuer. For this reason, analysts are not permitted to attend "road show" presentations by issuers that are corporate clients of the Firm relating to offerings of securities or any other investment banking transaction from that our clients may undertake from time to time. Analysts may, however, observe road shows remotely, without asking questions, by video link or telephone in order to help ensure that they have access to the same information as their investor clients.

Widely-attended conferences: Analysts are permitted to attend and speak at widely-attended conferences at which our firm has been invited to present our views. These widely-attended conferences may include investor presentations by corporate clients of the Firm.

Other permitted activities: Analysts may be consulted by Firm sales personnel on matters such as market and industry trends, conditions and developments and the structuring, pricing and expected market reception of securities offerings or other market operations. Analysts may also carry out preliminary due diligence and vetting of issuers that may be prospective research clients of ours.

INDUCEMENTS AND INAPPROPRIATE INFLUENCES

IIR prohibits research analysts from soliciting or receiving any inducement in respect of their publication of research and restricts certain communications between research analysts and personnel from other business areas within the Firm including management, which might be perceived to result in inappropriate influence on analysts' views.

Remuneration and other benefits: IIR procedures prohibit analysts from accepting any remuneration or other benefit from an issuer or any other party in respect of the publication of research and from offering or accepting any inducement (including the selective disclosure by an issuer of material information not generally available) for the publication of favourable research. These restrictions do not preclude the acceptance of reasonable hospitality in accordance with the Firm's general policies on entertainment, gifts and corporate hospitality.

DISCLAIMER

This publication has been prepared by Independent Investment Research (Aust) Pty Limited trading as Independent Investment Research ("IIR") (ABN 11 152 172 079), an corporate authorised representative of Australian Financial Services Licensee (AFSL no. 410381). IIR has been commissioned to prepare this independent research report (the "Report") and will receive fees for its preparation. Each company specified in the Report (the "Participants") has provided IIR with information about its current activities. While the information contained in this publication has been prepared with all reasonable care from sources that IIR believes are reliable, no responsibility or liability is accepted by IIR for any errors, omissions or misstatements however caused. In the event that updated or additional information is issued by the "Participants", subsequent to this publication, IIR is under no obligation to provide further research unless commissioned to do so. Any opinions, forecasts or recommendations reflects the judgment and assumptions of IIR as at the date of publication and may change without notice. IIR and each Participant in the Report, their officers, agents and employees exclude all liability whatsoever, in negligence or otherwise, for any loss or damage relating to this document to the full extent permitted by law. This publication is not and should not be construed as, an offer to sell or the solicitation of an offer to purchase or subscribe for any investment. Any opinion contained in the Report is unsolicited general information only. Neither IIR nor the Participants are aware that any recipient intends to rely on this Report or of the manner in which a recipient intends to use it. In preparing our information, it is not possible to take into consideration the investment objectives, financial situation or particular needs of any individual recipient. Investors should obtain individual financial advice from their investment advisor to determine whether opinions or recommendations (if any) contained in this publication are appropriate to their investment objectives, financial situation or particular needs before acting on such opinions or recommendations. This report is intended for the residents of Australia. It is not intended for any person(s) who is resident of any other country. This document does not constitute an offer of services in jurisdictions where IIR or its affiliates do not have the necessary licenses. IIR and/or the Participant, their officers, employees or its related bodies corporate may, from time to time hold positions in any securities included in this Report and may buy or sell such securities or engage in other transactions involving such securities. IIR and the Participant, their directors and associates declare that from time to time they may hold interests in and/or earn brokerage, fees or other benefits from the securities mentioned in this publication.

IIR, its officers, employees and its related bodies corporate have not and will not receive, whether directly or indirectly, any commission, fee, benefit or advantage, whether pecuniary or otherwise in connection with making any statements and/or recommendation (if any), contained in this Report. IIR discloses that from time to time it or its officers, employees and related bodies corporate may have an interest in the securities, directly or indirectly, which are the subject of these statements and/or recommendations (if any) and may buy or sell securities in the companies mentioned in this publication; may affect transactions which may not be consistent with the statements and/or recommendations (if any) in this publication; may have directorships in the companies mentioned in this publication; and/or may perform paid services for the companies that are the subject of such statements and/or recommendations (if any).

However, under no circumstances has IIR been influenced, either directly or indirectly, in making any statements and/or recommendations (if any) contained in this Report. The information contained in this publication must be read in conjunction with the Legal Notice that can be located at <http://www.independentresearch.com.au/Public/Disclaimer.aspx>.

THIS IS A COMMISSIONED RESEARCH REPORT.

The research process includes the following protocols to ensure independence is maintained at all times:

- 1) The research process has complete editorial independence from the company and this included in the contract with the company;
- 2) Our analyst has independence from the firm's management, as in, management/ sales team cannot influence the research in any way;
- 3) Our research does not provide a recommendation, in that, we do not provide a "Buy, Sell or Hold" on any stocks. This is left to the Adviser who knows their client and the individual portfolio of the client.
- 4) Our research process for valuation is usually more conservative than what is adopted in Broking firms in general sense. Our firm has a conservative bias on assumptions provided by management as compared to Broking firms.
- 5) All research mandates are settled upfront so as to remove any influence on ultimate report conclusion;
- 6) All staff are not allowed to trade in any stock or accept stock options before, during and after (for a period of 6 weeks) the research process.

For more information regarding our services please refer to our website www.independentresearch.com.au.

Contents

The Electron Age	1
Key Points	1
Valuation Summary.....	1
SWOT Analysis	2
Company Overview	3
Strategy and Project Overview	3
Alcoa MOU and Project Financing	4
Customer Engagement.....	5
Financial Position	5
Capital Structure	5
High Purity Alumina Project - FYI 100%	5
Location, Tenure and Infrastructure	5
Cadoux Kaolin Operations.....	7
HPA Plant Operations - Kwinana	8
Development Studies.....	11
Summary of Planned Activities.....	14
Peers.....	14
Valuation	14
Board and Management	16
Background - HPA Markets.....	17
What is HPA, and What are Its Uses?.....	17
HPA Producers and Current Pricing	19
Demand and Pricing Forecasts	20

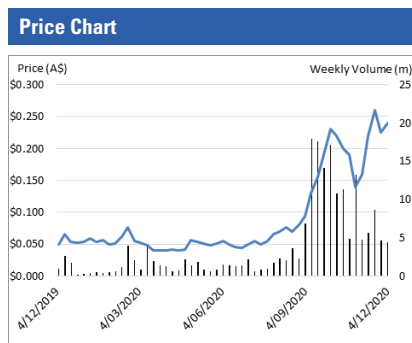


Note: This report is based on information provided by the company as at December 8, 2020

Investment Profile	
Share Price - December 7, 2020	A\$0.24
Per Share Valuation	A\$0.57
Issued Capital (inc November 30 placement):	
Ordinary Shares	300.8 m
Unlisted Options	52.4 m
In Money Options	52.4 m
Fully Diluted	353.2 m
Diluted for In Money Options	353.2 m
Market Capitalisation	A\$72.19 m
12 month L/H	A\$0.033/\$0.32
Current Cash	A\$7.40 m
Additional Cash Should all In-Money Options be Exercised	A\$7.57 m

Board	
Mr Edmund Babington: Non-Executive Chairman	
Mr Roland Hill: Managing Director	
Mr David Sergeant Non-Executive Director	
Mr Adrian Jessup: Non-Executive Director	

Major Shareholders	
Andrew Spinks	8.87%
Regal Funds Management	8.02%
Roland Hill	5.54%
Top 20	48.85%
Board	8.41%



The investment opinion in this report is current as at the date of publication. Investors and advisers should be aware that over time the circumstances of the issuer and/or product may change which may affect our investment opinion.

THE ELECTRON AGE

The move towards the increased use of “green” technology has resulted in forecast and actual strong growth in the demand for materials used in the new technologies. One such material is high purity alumina (“HPA”), which is finding increased use as a substrate in LED bulbs, and more recently as an anode/cathode separator in lithium ion batteries, given increasing energy density and hence operating temperatures that traditional polymer separators cannot deal with. Forecasters have demand for the widely used “4N” (99.99% purity) HPA increasing more than 4x from the 2018 demand of ~30,000 tonnes to close to 140,000 tonne.

HPA has traditionally been produced by the chemical treatment of high value feedstock (such as aluminium metal), leading to a cost of production of ~US\$15,000/tonne, however other processes have been known about, but not viable given the previous small 4N HPA market.

The growth in the markets provides an ideal opportunity for FYI Resources (“FYI”, “the Company”) to bring to fruition development of the HPA Project (“the Project”), with processing based on the hydrochloric acid leach and subsequent recrystallisation of aluminous clay feedstock. One requirement for a successful operation is high purity feedstock, with FYI planning to source high grade kaolinite from the 100% owned and fully permitted Cadoux deposit, located some 260 km NE of Perth in Western Australia. This is planned to be processed to HPA at a purpose built 8,000 tpa facility in the Kwinana Industrial Area (“KIA”) south of Perth, with a suitable block of land reserved.

Activities to date have been very positive, including successful continuous pilot plant operations, that has produced the required 4N grade material, with some close to the higher purity (and value) 99.999% 5N product. This work has also allowed for processing to be optimised, and has provided samples to potential customers, a critical part of the qualification process in the specialty chemical industry. Assessment and test work completed on the customer samples has shown that the material is fit for purpose in the key parameters including purity, levels of deleterious elements and morphology.

A critical element of any such project is financing, with FYI making advances on that front - this includes an equity facility for up to A\$80 million with Luxembourg-based private equity group GEM Global Yield LLC SCS (“GEM”), and a non-binding MoU with Alcoa of Australia (“Alcoa”) working towards a possible development JV. The recent placement that came “out of the blue” also highlights investor appetite.

With FYI looking towards a final investor decision (“FID”) in H1, 2021, and the potential, subject to financing, to commence operations in early 2023, we see steady newsflow coming from the Company.

KEY POINTS

Positive DFS: The Definitive Feasibility Study (“DFS”) completed in early 2020 presented a robust, high margin and long term project, with an after tax NPV₁₀ of US\$543 million, upfront capital of US\$198 million, C1 costs of \$6,217/tonne HPA and forecast selling costs of US\$24,000/tonne HPA.

High purity feedstock: The Cadoux deposit, which has Resources to feed an operation significantly longer than the 25 years as presented in the DFS, can produce a close to pure kaolinite plant feedstock through just simple screening.

Successful pilot plant runs: These go some way to derisking the technical side of the Project, and have highlighted the potential to produce high quality, low deleterious element HPA.

Cashed up: Given the recent placement, FYI should now have sufficient cash to take it to a FID, with additional potentially available from the exercise of options.

VALUATION SUMMARY

We have a risked per share valuation for FYI of A\$0.57 per share, with this based on a conceptual 70% debt/30% equity after tax funded scenario, and a diluted share base of 549.2 million based on an equity raise price of A\$0.50/share. The risk factor of 25% reflects the stage of the HPA Project, and will increase as critical items, including finance, progress, giving significant upside.

FYI indicative base case valuation						
Item	Total	Total/Share	Risk Factor	Risked	Risked/Share	Notes
HPA	A\$1,179 m	A\$2.15	25.0%	A\$295 m	A\$0.54	NPV 7.5%
Cash	A\$7 m	A\$0.02	100%	A\$7 m	A\$0.02	
Option Cash	A\$8 m	A\$0.01	100%	A\$8 m	A\$0.01	
Total	A\$1,194 m	A\$2.19		A\$310 m	A\$0.57	

Source: IIR analysis

Please note that our valuation is based on a conceptual funding scenario only - this could well change, with options including a change in the debt/equity mix, else a strategic project equity sale amongst others.

SWOT ANALYSIS

Strengths

- ◆ **High grade and purity kaolin feed:** A key requirement for any high purity chemical production is high purity ingredients - in the Cadoux kaolinite deposit FYI has suitable material to produce 4N, and even 5N HPA.
- ◆ **Successful pilot plant:** The bespoke pilot plant has successfully produced high quality 4N HPA, with assessment by potential customers confirming the quality of the product.
- ◆ **Stable and infrastructure rich jurisdiction:** Western Australia is a stable major player in the mining and downstream processing industries, with the Company's proposed sites both being well served by the required infrastructure.
- ◆ **Supportive government:** Western Australia is eager to promote and develop "green" projects, and is a major producer of raw materials for the ongoing energy revolution. As such, it has been awarded FYI "Lead Agency" support that will help ease permitting and bureaucratic processes.
- ◆ **Alcoa's interest:** The MOU with Alcoa highlights the potential of the Project, and should this lead to a JV, will make significant progress to financing and development.
- ◆ **Relatively low cost production:** With an estimated cash cost of production of under US\$7,000 per tonne of 4N HPA, the cost of FYI's process is significantly less than current production, which is in the order of \$15,000 per tonne.
- ◆ **Experience Board and Management:** The Board and Management have extensive experience technically and corporately in the resources sector. They also have significant shareholdings in FYI, aligning their interests with other shareholders.

Weaknesses

- ◆ **Commercially unproven process:** Although shown to work at a pilot plant scale, the acid leach HPA process is still unproven on a commercial scale for production of the high purity 4N product. However the process was utilised during WW11, producing 3N (smelter grade alumina) from kaolin clays as an intermediate process in aluminium production.
- ◆ **Opaque market, customer specific products:** The HPA, like most specialty chemical markets is opaque, and gaining entry can be difficult and time consuming; this is compounded by having largely to tailor products to suit the requirements of specific customers.

Opportunities

- ◆ **Growing HPA market:** This is the key opportunity for FYI, with the company ideally placed to take advantage of the forecast growth in 4N HPA markets and supply deficits going forward. There is also the opportunity to produce the significantly higher 5N HPA should customers request it, and the economics warrant.
- ◆ **Capacity expansion:** Should markets warrant it, the Company would consider expanding production from 8,000 tpa down the track.

Threats/Risks

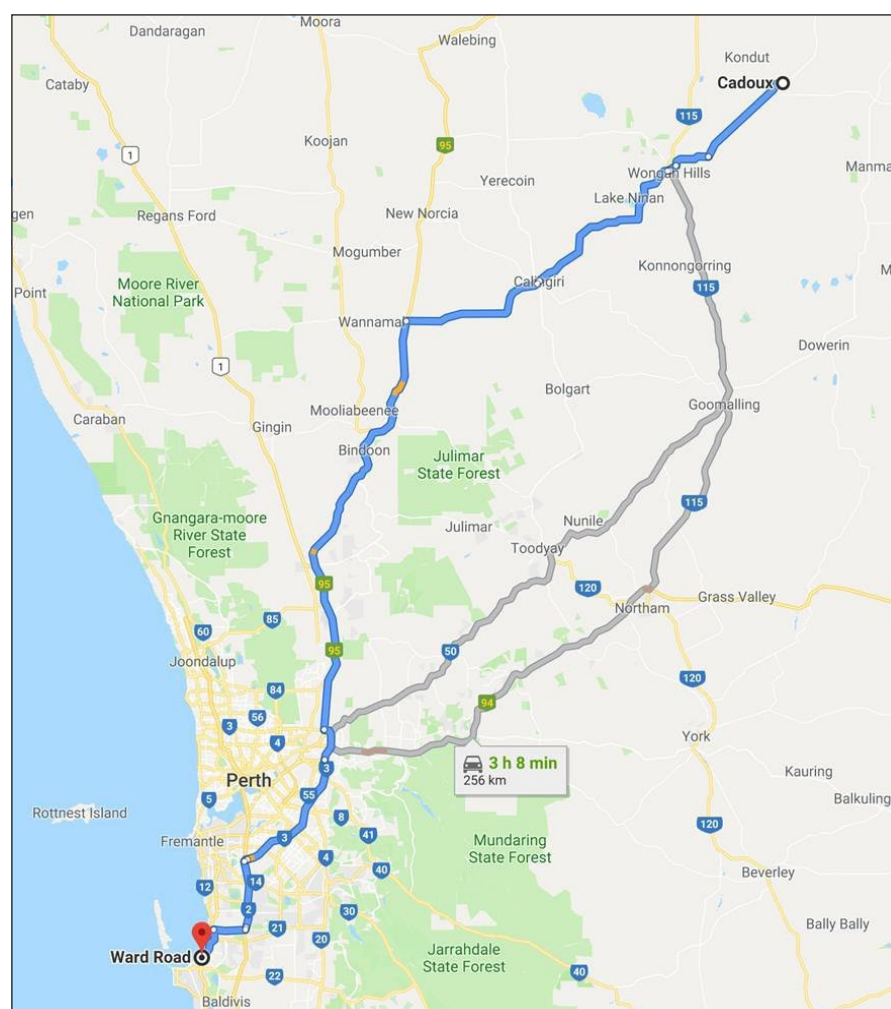
- ◆ **Financing:** Soft markets may affect the ability of the Company to finance the Project - we consider this the key risk.
- ◆ **HPA markets:** There is a chance of significant new production coming on stream (possibly from China), that may push 4N HPA prices down; in addition forecast demand may not turn out to be as strong as expected, again weighing on price. The opposite market factors can also apply however, which would likely positively impact prices.
- ◆ **Ramp up and operational risk:** Being a relatively new process, there is the chance that the planned operation may not perform as expected and produce the quality and consistency of product required for customers; this risk however is somewhat mitigated by the success of the pilot plant.

COMPANY OVERVIEW

STRATEGY AND PROJECT OVERVIEW

- ◆ FYI's strategy is to become a significant producer of 99.99% ("4N") HPA, using an acid leach process to treat high purity aluminous clays, with a planned output of 8,000 tpa HPA.
- ◆ Major growth in demand for high quality HPA is forecast over coming years, with this to be driven by growth in the use of LED lighting (which uses sapphire glass produced from HPA as a substrate) and the growing use of HPA in separator sheets for lithium ion batteries, replacing polymer-only separators as battery temperatures increase with increasing battery energy density.
- ◆ Kaolinite is to be mined and beneficiated at the Company's 100% owned Cadoux deposit, 256 km from Perth in Western Australia, with beneficiated high grade kaolinite (~37% Al_2O_3 screened) then to be trucked to be processed at its HPA plant located within the Kwinana Industrial Area ("KIA"), located south of Perth (Figure 1), and part of the broader Western Trade Coast.
- ◆ The proposed Cadoux operations are within a granted mining licence ("ML" M70/1388), itself within a broader exploration licence ("EL" E70/4673), with the Company also having been offered an industrial site in the KIA, with excellent access to both transport and power infrastructure.

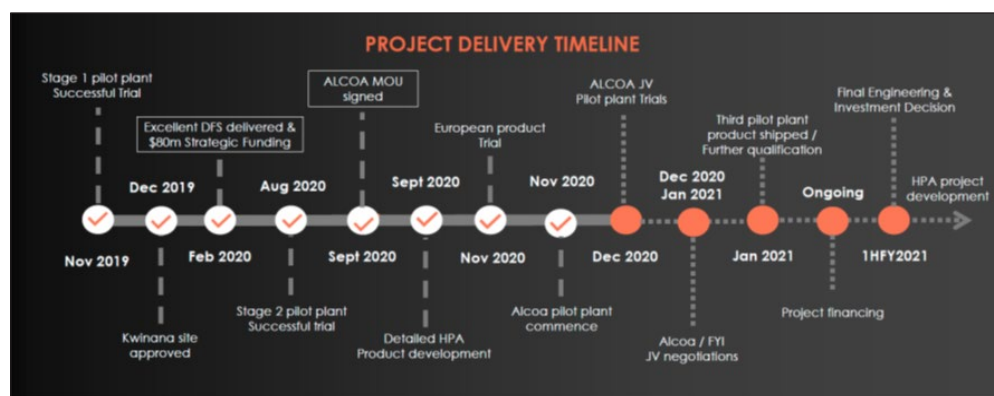
Figure 1: Project location map



Source: FYI

- ◆ Following the completion of the DFS in early 2020, the Company is targeting a final investment decision in early to mid 2021, following which, subject to funding, construction and commissioning to take around 18 months, with production then to commence in late 2022/early 2023.
- ◆ Expected production is 5,600 tonnes of HPA in year 1, thereafter rising to 8,000 tpa from years 2 to 25 as modelled in the DFS, completed in March 2020.
- ◆ Resources at Cadoux are more than sufficient however to feed a 50 year operation.

Figure 2: Project timeline



Source: FYI

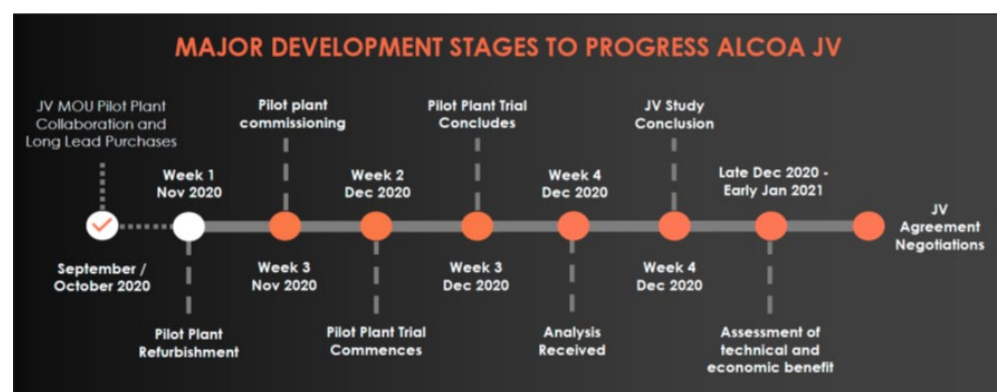
ALCOA MOU AND PROJECT FINANCING

- ◆ With expected upfront capital costs of US\$189 million (~A\$270 million), project financing is a key consideration, and a factor that the Company has been working on.
- ◆ To date two initiatives have been announced - an MOU to explore a development JV with Alcoa, and entering into an equity agreement for up to A\$80 million - these are described below.
- ◆ The Company is exploring all avenues with regards to project financing, including amongst others traditional debt/equity financing, offtaker financing and attracting a strategic partner.

Alcoa MoU

- ◆ As released to the market on September 8, 2020, the Company has entered into a strategic MOU with Alcoa for the potential development of the Project.
- ◆ The aim is to look to enter into a development joint venture, with conditions precedent including the completion of further successful HPA pilot plant variability trials - a time line is shown in Figure 3.
- ◆ As announced to the market on December 3, 2020, the plant is currently being refurbished at Alcoa's cost, with a recommissioning due shortly for an additional continuous one week run, with collaborative operation and demonstration of the pilot plant being some of the conditions precedent of the agreement.

Figure 3: Alcoa MoU timeline



Source: FYI

GEM Equity Facility

- ◆ As announced alongside the DFS results, an equity financing facility of up to A\$80 million has been entered into with Luxembourg based private equity group GEM, providing up to 30% of the expected capital costs as forecast in the DFS.
- ◆ Any draw down on the facility will be at FYI's election - key terms of any draw down include:
 - 15 days notice to be given; and,
 - The price will be 90% of the higher of the average closing bid price over the notice period, or a floor price as agreed by the parties.

- ◆ Fees associated with the agreement include:
 - The issuing of 46.7 million options with an exercise price of A\$0.15 and an expiry date of March 5, 2024 (already issued); and,
 - A fee of 2% of the Equity Commitment within 18 months - the Company may elect to pay this in shares.

CUSTOMER ENGAGEMENT

- ◆ One of the vital stages in any speciality chemicals development is customer engagement and product qualification.
- ◆ FYI has been active on this front, and is developing the relationships required to gain a foothold into the HPA market.
- ◆ A key factor in this has been the pilot plant, which has allowed for the initial supply of product to potential customers, which has been followed up by larger samples when requested.

FINANCIAL POSITION

- ◆ As of September 30, 2020 the Company had A\$0.41 million in cash - subsequent inflows have included cash on option conversion, an Australian Government R & D refund of A\$0.925 million, A\$1.4 million, being the 2nd tranche of an A\$2.7 million capital raising and A\$6 million from a recent placement - as of the time of writing the cash position was ~A\$7.4 million.
- ◆ The first mentioned raising, which took the form of a placement, involved the issue of 45 million shares at A\$0.06/share.
- ◆ The second placement was done through the issue of 30 million shares at A\$0.20/share, a 9% discount to the market price at the time of the announcement.
- ◆ This raise, which was not solicited by the Company, was to major institutional and high net worth individuals.
- ◆ As mentioned previously FYI has an A\$80 million equity facility in place with GEM which is targeted to fund project development.

CAPITAL STRUCTURE

- ◆ Following the recent placement FYI has 300.8 million fully paid ordinary shares on issue and 52.4 million unlisted options - options have exercise prices of between A\$0.10 and A\$0.15, and expiry dates ranging from July 31, 2021 and March 5, 2024.
- ◆ 46.7 million unlisted options are held by GEM, issued as part of the funding facility - these have an exercise price of A\$0.15 and an expiry date of March 5, 2024 - should these be exercised, GEM will hold 13.4% of the equity diluted for the option exercise.
- ◆ 52.4 million options are currently in the money, with the potential to bring in A\$7.575 million if exercised.
- ◆ The largest shareholder is Mr Andrew Spinks, with 8.87%; the Board holds 8.41%, including the Managing Director, Mr Roland Hill, with 5.54%.

HIGH PURITY ALUMINA PROJECT - FYI 100%

LOCATION, TENURE AND INFRASTRUCTURE

- ◆ The HPA Project is divided between two sites - the Cadoux kaolin deposit NE of Perth and the HPA plant site in the KIA (Figures 1, 4 and 5).
- ◆ The Cadoux deposit is covered by the 237.04 ha ML70/1388, which was granted for a period of 21 years on June 14, 2019 - this is surrounded by the 16 sub-block (~47 km²) E70/4673, which was granted for a period of 10 years on January 21, 2015.
- ◆ The Cadoux licences are located over freehold land, and are located ~295 NE of the proposed Kwinana plant by sealed roads - the area is also served by grid power, with sufficient capacity to supply the planned operation.
- ◆ The KIA block covers an area of ~6 ha, and has been offered to FYI on a 25 year renewable lease - other details are currently being negotiated.

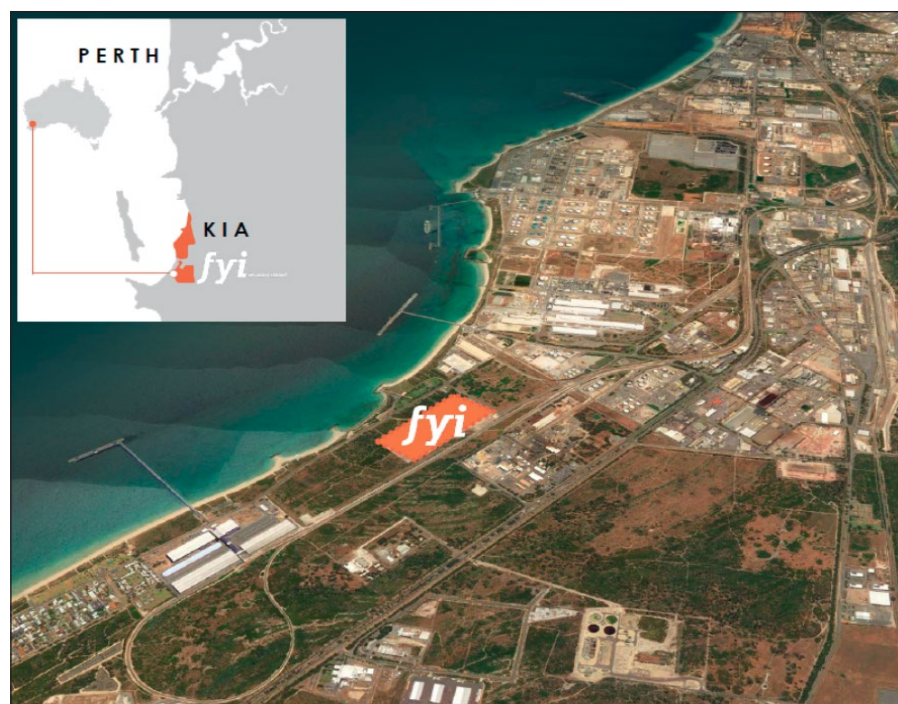
- ◆ The proposed plant is in an area colloquially known as “Battery Valley”, with recent developments including the first 24,000 tpa stage of Tianqui’s planned 48,000 tpa lithium hydroxide plant (for the conversion of spodumene concentrate), and with Covalent Lithium (Wesfarmers/SQM) also having a lithium hydroxide conversion plant, albeit with the investment decision currently on hold.
- ◆ Other operators in the KIA include Alcoa (aluminium smelter), BP (oil refinery) and BHP/ Nickel West (nickel refinery); the KIA is well served by transport and energy infrastructure.

Figure 4: Cadoux mine site location



Source: FYI

Figure 5: HPA plant site location, KIA



Source: FYI

CADOUX KAOLIN OPERATIONS

Introduction

- ◆ Cadoux was selected to supply the feedstock for the HPA Project due to the quality of the clay and proximity to the KIA - qualities include high purity with low levels of deleterious elements, and the ability to be upgraded through simple screening.

Summary of Work

- ◆ Previous work was carried out by White Gold Kaolin ("WGK") from 2011 to 2014.
- ◆ Work by FYI has included additional drilling, the estimation of Mineral Resources and Ore Reserves (Table 1) and bulk sampling for use in metallurgical testwork.
- ◆ Drilling by FYI has included 47 aircore holes for 824 m in 2017, and 75 RC holes for 1,613 m in 2018, with all holes being vertical.

Table 1: Cadoux JORC 2012 compliant MRE and Ore Reserves

Meckering JORC 2012 compliant MRE and Ore Reserves						
Category		Quantity (Kt)	Al ₂ O ₃ %	Fe ₂ O ₃ %	K ₂ O %	TiO ₂ %
Ore Reserve	Proved	290	24.9	1.1	0.5	0.8
	Probable	2,914	24.8	1.1	0.6	0.9
	TOTAL	3,205	24.8	1.1	0.5	0.9
Mineral Resources (inc Ore Reserves)	Measured	480	23.56	1.24	1.18	NA
	Indicated	5,743	23.36	1.19	1.09	NA
	Inferred	5,045	21.45	0.59	0.91	NA
	TOTAL	11,268	22.51	0.92	1.02	NA

Source: FYI

- ◆ Although the DFS has been predicated on a 25 year operation, current Reserves are more than sufficient for a 50 year operation.

Geology

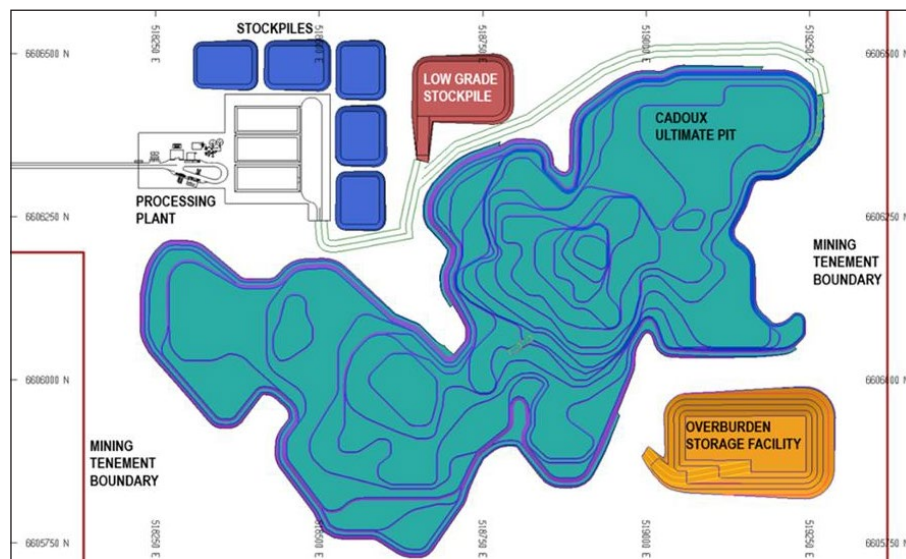
- ◆ The aluminous clay at Cadoux has been formed by the ancient and prolonged natural weathering of underlying granites, and is comprised largely of silica/quartz (SiO₂) and kaolinite (Al₂Si₂O₅(OH)₄).
- ◆ Weathering is to a depth of between 10 m and 30 m, with the kaolin profile ranging between 1 m and 22 m - the average thickness is 16 m, with this overlain by ~5 m of lateritic crust, and underlain by mottled clays which themselves are underlain by the fresh granite.
- ◆ The overall Cadoux Reserve has an alumina (Al₂O₃) content of around 24.8%, with this being upgraded to ~37% Al₂O₃ (wet) through simple screening.
- ◆ The beneficiation performance of the RoM ore has been estimated from our Al₂O₃ mass balance calculations using Reserve grade (24.8% Al₂O₃), RoM tonnes (53,500 tpa), beneficiated ore/HPA plant feed tonnes (35,000 tpa), HPA plant recovery (61%) and final HPA production (8,000 tpa).
- ◆ This results in a dry beneficiated kaolin grade of ~39% Al₂O₃, and a RoM moisture content of 5%, therefore with a grade of 37% Al₂O₃ for the material to be trucked to Kwinana - these figures have been confirmed by the Company.
- ◆ The upgraded material is marked by very low impurities (due to the long term weathering), which results in the suitability for use as the HPA feedstock - the grade also indicates that the upgraded material has an Al₂O₃ content very close to that of pure kaolinite.
- ◆ Pure kaolinite (Al₂Si₂O₅(OH)₄) comprises the following oxides:
 - Alumina – Al₂O₃ – 39.5 weight percent,
 - Silica – 2SiO₂ – 46.6 weight percent; and,
 - Water – 2H₂O – 13.9 weight percent.

Planned Operations

- ◆ Planned operations at Cadoux will include contract mining, ROM stockpiling, beneficiation (dry screening) and loading the upgraded material into b-double combinations for transport to Kwinana.

- ◆ Mining, which will be free dig, will be undertaken on a campaign basis every three years - it is estimated that each mining campaign, to be carried out in summer, will take between two and three months, with contract mining being used - the life of mine strip ratio is 1.8:1.
- ◆ Given the requirement to allow for no contamination of the feed, a mining recovery of 90% has been assumed, with material showing any discoloration (indicating impurities) to be treated as waste.
- ◆ Screening and loading/trucking operations will be year round, and operate on the ore stockpiled from the mining campaigns.
- ◆ It is estimated that ~53,500 tpa of ore will be required to produce 8,000 tpa of HPA - screening will result in the production of 35,000 tpa of plant feed to be trucked, with, as mentioned above this having an estimated moisture content of ~5% and Al₂O₃ grade of 37%.

Figure 6: Cadoux mining and beneficiation plan



Source: FYI

Permitting

- ◆ All major permits are in place for Cadoux, including an approved Mining Plan ("MP") and Mine Closure Plan ("MCP") - estimated mine closure costs of A\$5 million have been included in the DFS financial modelling.

HPA PLANT OPERATIONS - KWINANA

Introduction

- ◆ The HPA plant has been designed to produce 8,000 tpa of 4N HPA per annum, with the potential to produce higher value 5N HPA should customers require it.
- ◆ The site of the proposed plant is on a 6 ha block within the KIA, with ready access to transport and power infrastructure - screened high grade kaolin will be trucked ~295 km from Cadoux.

Figure 7: Kwinana plant schematic

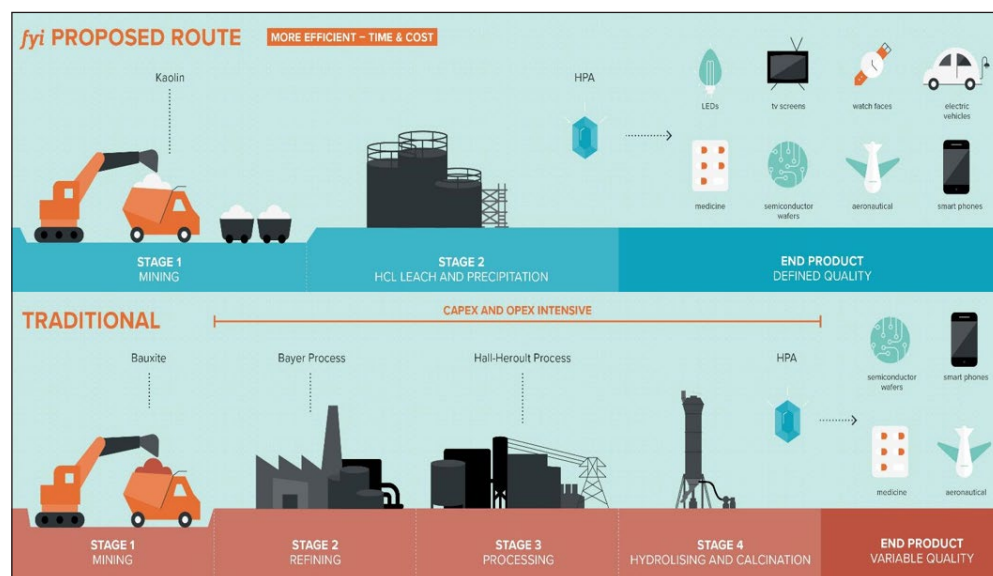


Source: FYI

FYI's HPA Process

- ◆ The key to FYI's strategy is the successful processing of the clay feedstock to HPA using a hydrochloric acid leach process - this historically developed process has been adapted to suit the Cadoux feedstock.
- ◆ The Company aims to produce what is known as 4N HPA, which has a purity of 99.99% alumina. Other products include 5N HPA (99.999% purity) and 6N HPA (99.9999% purity) – the Company may consider producing 5N HPA should customers require it; FYI will not target the lower value smelter grade alumina ("SGA") or 3N HPA.
- ◆ The key to the success of the process (in addition to the purity of the Cadoux feedstock) is the three stage $AlCl_3$ crystallisation/washing circuit and following calcining circuit to produce the final 99.99% Al_2O_3 product - these retain the purity and do not reintroduce contaminants into the final product.
- ◆ The acid leach method of extracting alumina from aluminous clays was originally developed by the Swiss in the early 1900s, and developed further by the US Government and Alcoa in the early 1980's as a possible smelter grade alumina ("SGA") process - this however couldn't compete on costs at that time with the Bayer Process for extracting alumina from bauxite due to the low value of the SGA end product.
- ◆ Current producers use relatively high cost feedstock, predominantly aluminium metal to produce HPA - for example, Sumitomo synthesise aluminium alkoxide from aluminium metal and alcohol, which is then hydrolysed to form hydrated alumina - this is then calcined to form HPA (Figure 8) - costs are estimated in the order of US\$15,000/tonne 4N HPA.
- ◆ The acid leach process has a number of advantages over existing producers, including:
 - Expected lower operating costs due to low cost feedstock and the recycling of hydrochloric acid,
 - The use of hydrochloric acid doesn't introduce potential contaminants (e.g. sodium as the case with the Bayer Process) into the process, and hence simplifies the process of producing 4N HPA; and,
 - The waste product, ~10,000 tpa silica, is benign and potentially marketable, with the Company looking at potential customers - material that is not sold will be able to be backloaded to Cadoux.

Figure 8: HPA production comparison

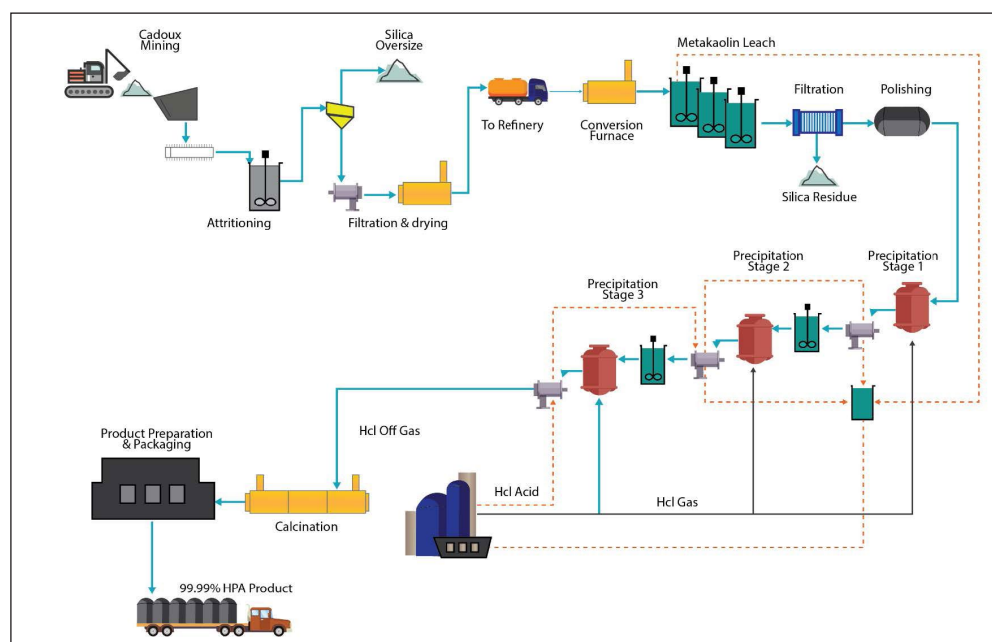


Source: FYI

- ◆ A schematic flowsheet is shown in Figure 9, with the processing to be carried out at the Kwinana plant including:
 - Drying and then calcining at 700° C which activates the kaolin to produce metakaolin,
 - Leaching of the metakaolin using hydrochloric acid - this produces the leachate (which contains the Al^{3+} ions) and a silica residue - the residue is neutralised to form a fine silica product for sale or disposal - we estimate that ~9,000 tpa of silica will be produced,
 - $AlCl_3$ is crystallised by introducing HCl gas into the leachate - there are three stages of crystallisation with these being separated by dissolution of the $AlCl_3$ crystals in water; and,

- Production of 99.99% Al_2O_3 through roasting of the AlCl_3 at 700°C , calcining at $1,200^\circ\text{C}$ and then cooling - this is then washed and prepared for sale/export.
- The product will be initially finished as a powder; dependent upon customers' requirements however, there will be the option to produce beads, pucks or crackle (uncrystallised sapphire material).

Figure 9: FYI schematic HPA production flowsheet

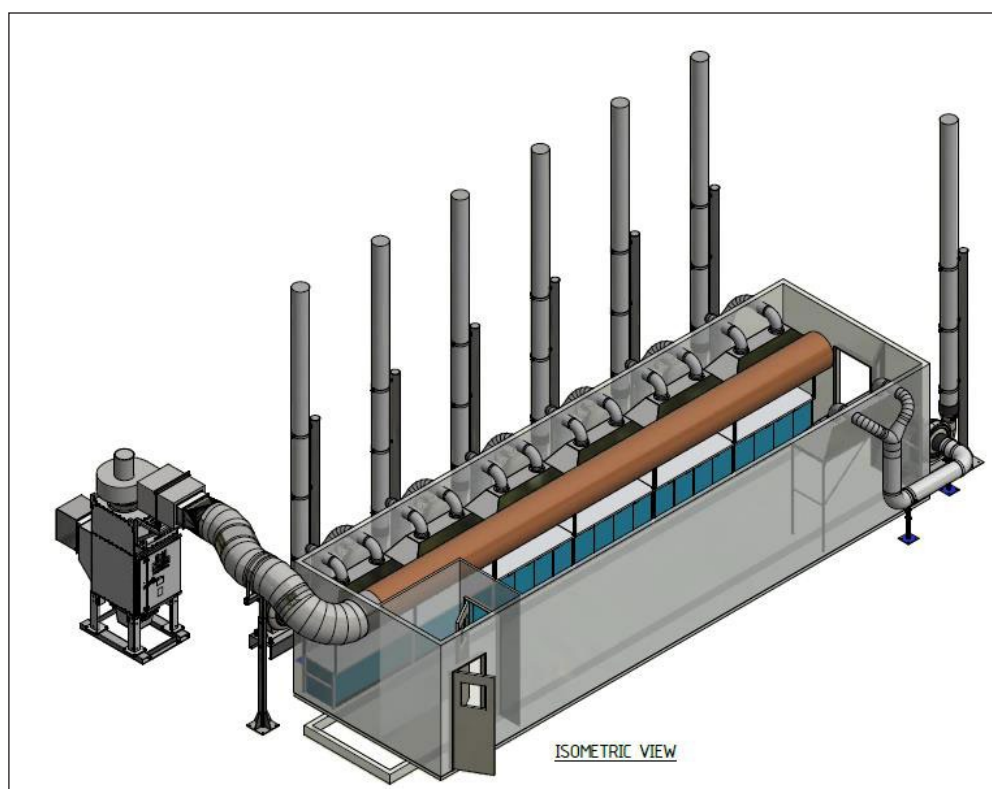


Source: FYI

Pilot Plant Operations and Product Testing

- ◆ The Company has successfully completed a series of pilot plant trials at a custom made facility in Welshpool, Perth - the plant has the capacity to produce up to 1 kg per hour of HPA, and is now being used as part of the trials in progressing the Alcoa MOU.
- ◆ The pilot scale work has a number of aims, including demonstrating that the process stream as developed can produce 4N HPA from a continuous operation for 24/7 rather than just from isolated locked cycle and bench scale tests.
- ◆ A key element has been producing samples to be provided to potential customers for qualification testwork - this is an important aspect in developing such an operation, as, unlike mainstream metals, specialty chemicals are tailored to the customers' requirements, and consistency is also required to enter into long term supply contracts.
- ◆ The work has been underway since late 2019, and has also consistently produced 4N HPA (and close to 5N HPA) from variability testwork, and has been used in refining/optimising the HPA flow sheet - an initial run was completed in late 2019, with the second completed in August 2020 - the second run was partially undertaken to meet requests for additional samples following assessment by potential customers of samples for the first run.
- ◆ Following quality control testwork and analysis, samples, ranging in weight from 5 kg to 20 kg from the second programme have been sent to potential customers for assessment - in addition the Company has undertaken finishing testwork at the request of interested parties.
- ◆ As released to the market on November 12, 2020, European product trials were successful, and confirmed the quality of FYI's HPA product - this work included an assessment of the quality, consistency and morphology of the product, with the conclusion that the purity is well above benchmark with the overall quality being very high, and suitable for the target products.
- ◆ Importantly, the levels of key deleterious elements, including Na, Fe and Pb were very low.
- ◆ The successful pilot scale work significantly de-risks the Project, however there will still be risk in the ~1,000 x upgrade (from 1 kg per hour to 1,000 kg per hour) from pilot scale to full production.

Figure 10: HPA pilot plant isometric view



Source: FYI

Quality Control Considerations

- ◆ A robust but adaptable process route is required in being able to provide the product consistency from variable feed, however the feed variability needs to be within tight parameters, as alluded to earlier, and as provided by the low impurity Cadoux kaolinite.
- ◆ Given the high purity of the final products and the need to maintain consistency of this, quality control will be a critical part of the operations.
- ◆ Premium quality equipment (which however is largely off the shelf) also needs to be used, as well as maintained - the Company has allowed for this in their costing in the DFS, including plant maintenance.
- ◆ Customers generally rely on long term contracts and consistency of product, and any variation from agreed quality may well led to loss of the custom and reputation, and a considerable period for re-qualification.
- ◆ Waste products, being silica sand (at Cadoux) and fine silica (at Kwinana), are benign, with all HCl being recycled in the processing - the Kwinana silica product will need to be disposed of or sold as produced, as there is only limited storage space on site - as mentioned unsold material can be back loaded to Cadoux.

DEVELOPMENT STUDIES

- ◆ In March 2020 the Company released the results of the DFS, which followed on from and developed upon a pre-feasibility study released in September 2018 - results are presented in Table 2, and inputs/assumptions in Tables 3 and 4.
- ◆ Planned operations are as discussed earlier, and include mining and screening at Cadoux, trucking to Kwinana for processing, and then exporting through a nearby port.
- ◆ Our view is that the results of the DFS are reasonable and robust, with a strong IRR of 46%, and an NPV to Capex ratio of 2.74:1, significantly above our rule of thumb minimum of 1:1.
- ◆ The costs in our view appear to be reasonable, however, with regards to the plant operating and capital costs the only comparable is Altech Chemicals (ASX: ATC, "Altech"), who are planning to produce 4,500 tpa of 4N HPA at a plant that is currently under construction in Johor State, Malaysia, from clay shipped from a kaolin mine in Meckering, WA.
- ◆ When adjusted for economies of scale given different planned HPA production rates and hence kaolin feed rates, operating costs between the two projects are comparable.

- ◆ However what is noticeable is that Altech has a higher capital intensity, even when using the potential plant capacity of 6,000 tpa for the Malaysian facility, rather than the planned 4,500 tpa throughput.
- ◆ There are a number of factors that can account for this, not the least that the Altech figure is a turnkey cost (which includes warranties); it has also had input from the potential major project debt providers, who will naturally look to de-risk exposure.
- ◆ Given the above, there is the chance that capital costs could increase, however the BFS (and our modelling) indicates that the Project is robust enough to accommodate a material increase in capital costs.
- ◆ One figure provided in Table 2 is an after tax EPS - note that this does not take into account dilution for future share issues, including those associated with development.

Table 2: HPA Project DFS outcomes

HPA Project DFS outcomes	
Parameter	Value
NPV post tax (@10%)	US\$543 m
IRR	46%
Payback period (years) (post tax) (inc ramp up)	3.6
Assumed exchange rate A\$/US\$	0.7
Life of Project Reserve (years)	25
Total Sales (initial 25 years) no escalation	US\$4.7 b
Total Project net operating cash flow (25 years)	US\$2.4 b
Annual EBITDA (average)	US\$133 m
Cash flow after finance and tax	US\$88 m
Shares on issue (as at publication of the DFS)	212,772,654
EPS after tax (per year)	\$0.41
Capex (8,000 tpa)	US\$198 m
Capex/t (US\$/t)	US\$23,575
Life of Mine C1 costs, FOB Kwinana (US\$/t)	US\$6,217
Tonnes Processed (initial 25 years) (kt)	198
Production Target (tpa) (initial 25 years)	8,000
Proven + Probable Ore Reserves @ 24.8% Al ₂ O ₃ (kt)	3,205
Ore Reserve life (years)	25
JORC Resources (million tonnes)	11.3

Source: FYI

Table 3: HPA Project DFS inputs

HPA Project DFS inputs	
Parameter	Amount/Notes
Currency	United States dollars Future sales contracts for HPA are usually based in US\$. The financial model is prepared in US\$. All A\$ inputs are converted to US\$ based on an exchange rate of A\$1.00 = US\$0.70.
Project life	25 years
Ore Reserves	Total Proven + Probable Ore Reserve alone supports a 25 years project. Mining will occur solely from the Proven + Probable Ore Reserve during the project life
Corporate tax rate	30%
Government royalty	2.50%
Depreciation rate	20%
HPA Production	Steady state of production from Proven + Probable Ore Reserves over life of mine, with HPA production in the first year being 5,600 tonnes per year and thereafter 8,000 tonnes per year.
Shares on Issue	212,772,654 (as at time of publication of DFS)
NPV estimation discount rates	Financial modelling has been conducted at 10% discount rate. A lower rate could be used as the current low cost of debt has reduced weighted average cost of capital.
Capital costs	US\$189 m, estimated at an accuracy of -5%/+15% as per recommended practice 18R-97 for process industries set out by AACE International for Class 3 estimates
Capex contingency	15% of capital cost
Sustaining capex	2% of capital costs, annually

HPA Project DFS inputs	
Parameter	Amount/Notes
Operating costs	US\$6,217/t HPA produced; costs estimates have been developed from first principles with an accuracy of -5%/+15%
Mine closure costs	US\$5 m as per Mine Closure Plan
Plant maintenance	7.2% of capital costs
Sales price	US\$24,000 per dry metric tonne, adopted price dependent on product type, product quality, country, contact terms and sales quantity Revenue is constant based on current prices and ignores any projected growth in commodity price or inflation
Debt financing	Up to 70% of capex (depending on the finance structure)
Borrowing rate	7.5%, tenor 6.5 years and grace period 2 years
Upfront financing cost	8% (assumption)
Working capital	US\$5 m
Accounts receivable	30 days
Accounts payable	30 days

Source: FYI

Table 4: HPA Project pit optimisation parameters

HPA Project pit optimisation parameters		
Item	Units	Value
Mining		
Ore Loss	%	10
Mining Dilution	%	0
Pit Slope	degrees	37° in all bearings
Mining Rate	dtpa	Variable
Mining Cost	AUD\$/t	3.85 – 4.85
Processing		
Cadoux Beneficiation Costs	AUD\$/ ore t	42.86
Cadoux Beneficiation Rate	dtpa	53,500
Cadoux to Kwinana transport costs	\$/t intermediate concentrate	55.49
Kaolin concentrate transport/ HPA Feed rate	dtpa	35,000
Kwinana HPA production costs	\$AUD/t ore	1357.1
Minimum HPA (99.99% Al ₂ O ₃) Production	tpa	8,000
Total Al ₂ O ₃ recovery from processing	%	61.28
Financials		
Product Price HPA	\$AUD/t	34,286.00
Royalties	% of product revenue	2.5
Exchange Rate	USD / AUD	0.7
Discount Rate	%	10

Source: FYI

Table 5: HPA Project sensitivities - US\$ million

HPA Project sensitivities - US\$ million				
Change	Sales Price	Throughput	Capex	Opex
-20%	US\$350	US\$401	US\$573	US\$597
-10%	US\$446	US\$472	US\$558	US\$570
Base	US\$543	US\$543	US\$543	US\$543
10%	US\$639	US\$614	US\$528	US\$516
12%	US\$736	US\$685	US\$513	US\$489

Source: FYI

SUMMARY OF PLANNED ACTIVITIES

- ◆ Current and upcoming activities will largely be involved with furthering the Alcoa negotiations (including the current pilot plant run, financing and product qualification (Figures 2 and 3).
- ◆ The Company is ideally targeting completion of financing (with a number of options being considered) in early to mid 2021, with an FID later in 2021, and with construction then to commence.
- ◆ An 18 month construction period has been estimated.

PEERS

- ◆ One of FYI's peers is Altech (market capitalisation A\$36 million), which, as mentioned previously, is currently developing a 4,500 tpa 4N HPA project in Malaysia (with a process similar to that of FYI), with the kaolin feed being sourced from Meckering in Western Australia.
- ◆ Altech has estimated a US\$9,900/tonne production cost, with a turnkey capital construction cost of US\$298 million.
- ◆ Although construction of some items of the Malaysian plant are underway, Altech is in the process of finalising some elements of the debt financing.
- ◆ Also in the HPA space is Alpha HPA (ASX: A4N, market capitalisation of A\$208 million), which is looking to use commercial feedstock in a proprietary solvent extraction process ("Alpha First") that uses two reagents - A4N has an agreement with Orica to source the reagents from Orica's Brisbane fertiliser plant, with A4N then supplying Orica with a by-product from the HPA manufacturing process.
- ◆ In the DFS as published in March 2020, A4N has estimated a capital cost of A\$308 million for a 10,000 tpa HPA facility, and cash operating costs (accounting for by-products) of A\$8,730/tonne, or A\$12,750/tonne not accounting for by-products.
- ◆ A4N has also run a pilot plant.
- ◆ Note that this is a different overall process to that of Altech and FYI, and there are number of details (including reagents) that are not disclosed due to the proprietary nature of the method.

VALUATION

- ◆ We have undertaken a valuation for FYI, with our per share valuation using a conceptual 70% debt/30% equity scenario presented in Table 5 - in this case the Project valuation is on an after tax and funded scenario - note that this is a conceptual scenario - the final structure is likely to be different, and may also include a sale of equity in the Project.
- ◆ Per share valuations are diluted for current options and the conceptual project finance equity (30% @ A\$0.50/share) - we have also included the cash on option conversion as a separate line - this has not been run through the HPA Project model.
- ◆ The Project valuation has been risked to reflect the project stage to arrive at an indicative per share market valuation - a rule of thumb is that straightforward mining projects that are financed and construction ready trade at a value of ~40% of the project's NPV.
- ◆ Given that FYI is a more complicated chemical production story, still needs to finalise financing and that no FID has yet been made amongst others, we have used a more conservative risk multiplier of 25%.
- ◆ We would expect upside with ongoing progress on outstanding items, and should the Project be developed, for the market valuation to approach the technical valuation on demonstrating successful operations.
- ◆ Also, given the nature of the Project as a chemical industry operation rather than a mining operation, a longer term valuation may be predicated upon earnings multiples, which are generally in the range of 5x to 8x EBITDA for this industry - using the peak EBITDA of A\$193 million from our modelling, this results in a value of A\$1 to A\$1.5 billion for a proven producing operation.
- ◆ Table 6 presents key model parameters, with Table 7 presenting key operational and financial outcomes, as well as the financing parameters.
- ◆ Table 7 also includes pre-tax/ungeared and post-tax/ungeared valuations.

- ◆ We have largely used inputs and the mining/production scenario as used in the DFS and the Cadoux pit optimisation, with two key differences:
 - We have used a discount rate of 7.5% as compared to 10% used by the Company; and,
 - We have allowed for an extra A\$50 million in financing above the A\$270 million capex to cover financing costs, reserved cash (as commonly demanded by debt providers) and working capital to give a buffer in the first year of operations.

Table 5: FYI indicative base case valuation

FYI indicative base case valuation						
Item	Total AUD	Total/Share	Risk Factor	Riskied AUD	Riskied/Share	Notes
HPA	A\$1,179 m	A\$2.15	25.0%	A\$295 m	A\$0.54	DCF 7.5%
Cash	A\$7 m	A\$0.02	100%	A\$7 m	A\$0.02	
Option Cash	A\$8 m	A\$0.01	100%	A\$8 m	A\$0.01	
Total	A\$1,194 m	A\$2.19		A\$310 m	A\$0.57	
Shares for Reporting	545,191,989		Post Tax	Funded		

Source: IIR analysis

Table 6: HPA Project - key inputs

Item	Units	Phase 1
HPA Peak Production Rate	tpa	8,000
Total HPA Production	t	197,600
Construction Start	Year	2,022
Construction End	Year	2,023
Production Start	Year	2,024
Mine Life	Years	25
Total Operating Costs	A\$/Tonne HPA	9,392
Up Front Capex	A\$ Million	270
Capital Intensity	A\$/tonne capacity	33,750
Up Front Capex	A\$/Tonne HPA LoM	1,366
Sustaining Capex Rate	% of Upfront pa	0
LOM Sustaining Capex	A\$ Million	135
Sustaining Capex	A\$/Tonne HPA LoM	683
Revenue	A\$/Tonne HPA	34,286
Operating Margin	A\$/Tonne HPA	24,893

Source: IIR analysis

Table 7: HPA Project - financial and operating outcomes

HPA Project - financial and operating outcomes		
Item	Units	Value
Financial and Operating Outcomes - 100% Basis		
Mine Life	Years	25
Total HPA Produced	Tonnes	197,600
HPA Sales Price	A\$/tonne	\$34,286
Pre-Tax NPV, mid-year	A\$m	\$1,567 m
Pre-Tax IIR	%	45%
Post-Tax NPV, Mid-Year	A\$m	\$1,194 m
Post-Tax IIR	%	38%
Funded, Post -Tax NPV	A\$m	\$1,179 m
LoM Revenue	A\$m	\$6,698 m
LoM Opex	A\$m	-\$1,856 m
LoM EBITDA	A\$m	\$4,842 m
LoM Capex	A\$m	-\$405 m

HPA Project - financial and operating outcomes		
Item	Units	Value
LoM Tax	A\$m	-\$1,315 m
LoM Interest	A\$m	-\$55 m
LoM FCF	A\$m	\$3,144 m
Peak Annual FCF	A\$m	\$144 m
Peak Annual EBITDA	A\$m	\$201 m
Discount Rate	%	7.50%
Corporate Tax Rate	%	30.00%
Project Financing		
Initial Capex	A\$m	\$270 m
Working Capital, Debt Service etc	A\$m	\$50 m
Total Financing Amount	A\$m	\$320 m
Project Finance Debt	%	70%
Debt Amount	A\$m	\$224 m
Financing Term	Years	\$5 m
Interest Rate	%	\$0 m
Project Finance Equity	A\$m	\$96 m
Equity Price	A\$/share	\$0.50
Diluted Shares on Issue	Million on Issue	549 m
Exchange Rate	AUD:USD	0.70

Source: IIR Analysis

- ◆ We have also undertaken a sensitivity analysis as presented in Tables 8 and 9 - Table 8 is included to present the sensitivity of the Project's technical valuation to changes in key factors, whereas Table 9 presents the sensitivity of the risked share price attributable to the Project to the same changes.
- ◆ What this presents is an overall robust project, that can absorb adverse changes of 20% in the key inputs.

Table 8: HPA Project unrisks pre-tax sensitivity analysis

HPA Project unrisks pre-tax sensitivity analysis				
Change	HPA Price	Mining Costs	Plant Costs	Capex
-20%	A\$1,045 m	A\$1,578 m	A\$1,698 m	A\$1,677 m
-10%	A\$1,306 m	A\$1,573 m	A\$1,633 m	A\$1,625 m
0%	A\$1,567 m	A\$1,567 m	A\$1,567 m	A\$1,567 m
10%	A\$1,828 m	A\$1,562 m	A\$1,502 m	A\$1,503 m
20%	A\$2,089 m	A\$1,557 m	A\$1,436 m	A\$1,433 m

Source: IIR analysis

Table 8: HPA Project risked per share sensitivity analysis

Risked HPA Project risked per share sensitivity analysis				
Change	HPA Price	Mining Costs	Plant Costs	Capex
-20%	\$0.365	\$0.540	\$0.580	\$0.573
-10%	\$0.451	\$0.539	\$0.558	\$0.556
0%	\$0.537	\$0.537	\$0.537	\$0.537
10%	\$0.622	\$0.535	\$0.515	\$0.515
20%	\$0.708	\$0.533	\$0.494	\$0.491

Source: IIR analysis

BOARD AND MANAGEMENT

- ◆ **Mr Edmund Babbington – Non-Executive Chairman:** Mr Babington is a Director of the Western Australian commercial law firm, Lyons Babington Lawyers. He is also a member of AMPLA (the Australian resources and energy law association), the Franchise Council of Australia and is a Western Australian committee member of the Australian Institute of Business Brokers.

Mr Babington is a specialist in mining and resources law and the law relating to capital raisings, stock exchange requirements, corporate governance and compliance for public companies.

- ◆ **Mr Roland Hill - Managing Director:** Mr Hill holds a Bachelor of Science and Bachelor of Commerce from Curtin University. Mr Hill was appointed to the position of Chief Executive Officer on 4 February 2011 and to the position of Managing Director on 1 July 2014.

Mr Hill has extensive resource industry and investment, finance and funds management experience. He has been directly associated with the mining and exploration sector for over 18 years in contracting roles and with Western Mining Corporation and Normandy Poseidon and a 7 year role as Managing Director and Chairman of Crescent Gold Limited – an ASX listed gold producer with production of ~100,000 oz pa.

Prior to Crescent Gold, Mr Hill was employed by several Australian national and international stockbroking firms and investment banks in ECM and as a senior mining analyst before taking a senior role as a Portfolio Manager with Deutsche Bank in their Australian and International resources equity Fund.

- ◆ **Mr David Sargeant - Non-Executive Director:** Mr Sargeant holds a Bachelor of Science degree in economic geology from the University of Sydney. He has more than 40 years of experience as a geologist, consultant and Company director. As such, he has been involved in numerous mineral exploration, ore deposit evaluation and mining development projects in Australia and internationally. He is a member of AusIMM and the Geological Society of Australia.

During his career, Mr Sargeant has held a range of senior positions, including that of senior geologist with Newmont Pty Ltd and senior supervisory geologist with Esso Australia Ltd at the time of the Harbour Lights Gold Mine discovery and development. Further, Mr Sargeant was the first chief geologist at Telfer Gold Mine during exploration, development and production at that project. In addition, he was exploration manager for the Adelaide Petroleum NL group of companies, manager of resources development for Sabminco NL and a technical director of Western Reefs Limited during the period in which that Company became a successful producer at the Dalgaranga Gold Project.

Mr Sargeant successfully managed an exploration and geological consulting business for 18 years, which included the formation and management of platinum and copper-gold companies in Botswana until they were taken over during the 2005 to 2007 period by United Kingdom listed public companies. He was the principal promoter in forming Empire Resources Limited and remains Managing Director.

- ◆ **Mr Adrian Jessup - Non-Executive Director:** Mr Jessup also holds a Bachelor of Science degree (with honours) in economic geology from the University of Sydney and has more than 40 years continuous experience as a geologist, company director and consultant involved in mineral exploration, ore deposit evaluation and mining. He is a member of AusIMM, the Geological Society of Australia and the Australian Institute of Geoscientists.

For the last 15 years, Mr Jessup has operated a geological consulting company. During that time, he was a founding director of publicly listed companies Empire Resources Limited and Sylvania Resources Limited.

He remains an executive director of Empire Resources Ltd. He was also a director of two mineral exploration companies based in southern Africa that were subsequently acquired by United Kingdom listed public companies.

Prior to commencing consulting, Mr Jessup was managing director of Giralia Resources NL for eight years, from the Company's inception in 1987. Previously, he had worked for AMAX Exploration Inc., as a senior geologist and as regional manager in charge of that Company's mineral exploration in Western Australia.

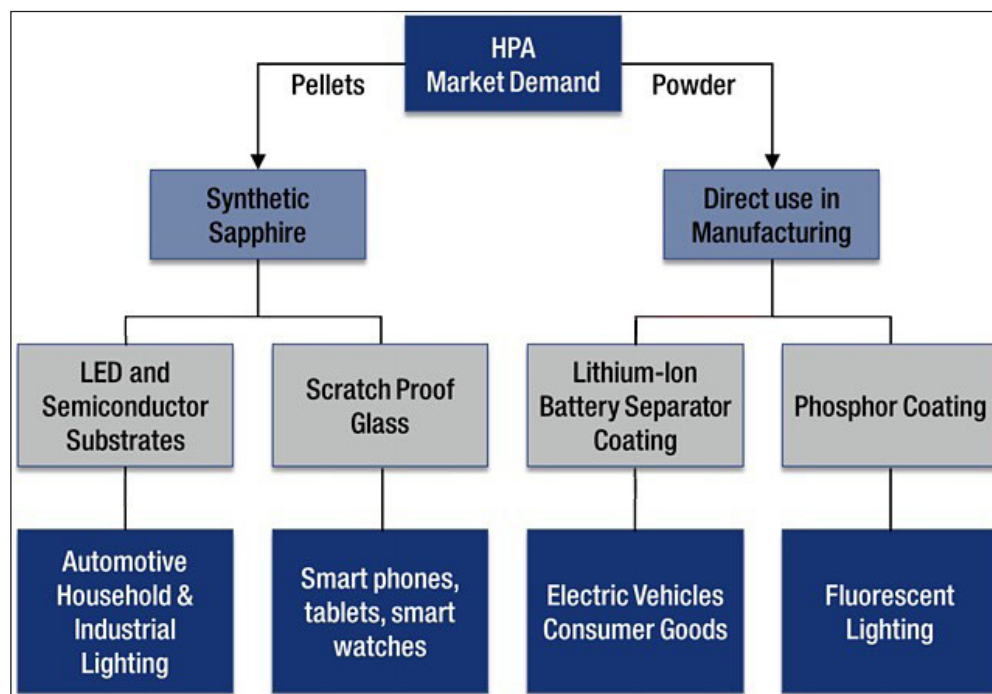
BACKGROUND - HPA MARKETS

WHAT IS HPA, AND WHAT ARE ITS USES?

- ◆ As its name suggests, HPA is a high purity form of aluminium oxide, commonly known as alumina. Alumina is the basic feedstock for aluminium production, albeit in a lower purity form, which comprises approximately 90% of the demand for alumina - the remaining 10% is used in the non-metallurgical market for specialty or chemical use, of which HPA is the high end product.

- ◆ The gemstone sapphire is also a form of HPA, and can occur naturally as well as being formed in the laboratory from 99.99% (or higher purity) HPA, with artificial sapphire being one of the key uses for HPA.
- ◆ Artificial sapphire is produced by heating HPA powder in an autoclave to its melting point of 2,000°C under intense pressure, at which point an individual crystal is formed; the crystal is then allowed to cool (~22 day cycle), and then can be cut using diamond cutting equipment to suit individual applications.
- ◆ HPA has a number of desirable properties that make it an important part of the technology industry:
 - High thermal and low electrical conductivity (important in the electronic and battery applications),
 - Hard and strong in the sapphire form – sapphire has a hardness of 9 on the Mohs scale, second only to diamond, and is important for abrasive applications, including sapphire single crystal applications (phone screens amongst others),
 - Resistant to corrosion – important in semiconductor manufacturing and display screens, where corrosion by plasma is an issue,
 - High brightness – key in effective LED lighting, which is more energy efficient than traditional incandescent bulbs – different jurisdictions have mandated requirements to introduce LED lighting as a replacement for incandescent lighting; and,
 - Biocompatibility – important in prosthetic devices including implants.
- ◆ The main uses for HPA are shown in Figure 11, with the use in battery separators forecast to lead growth over coming years.
- ◆ In our discussion we will concentrate on 4N HPA, which has around 70% to 75% of market share, and which is the market that FYI is targeting.
- ◆ The LED lighting markets have been the dominant driver of increases in demand for 4N HPA over recent years, with these steadily replacing incandescent bulbs due to their higher efficiency, with this replacement also being mandated in a number of countries.

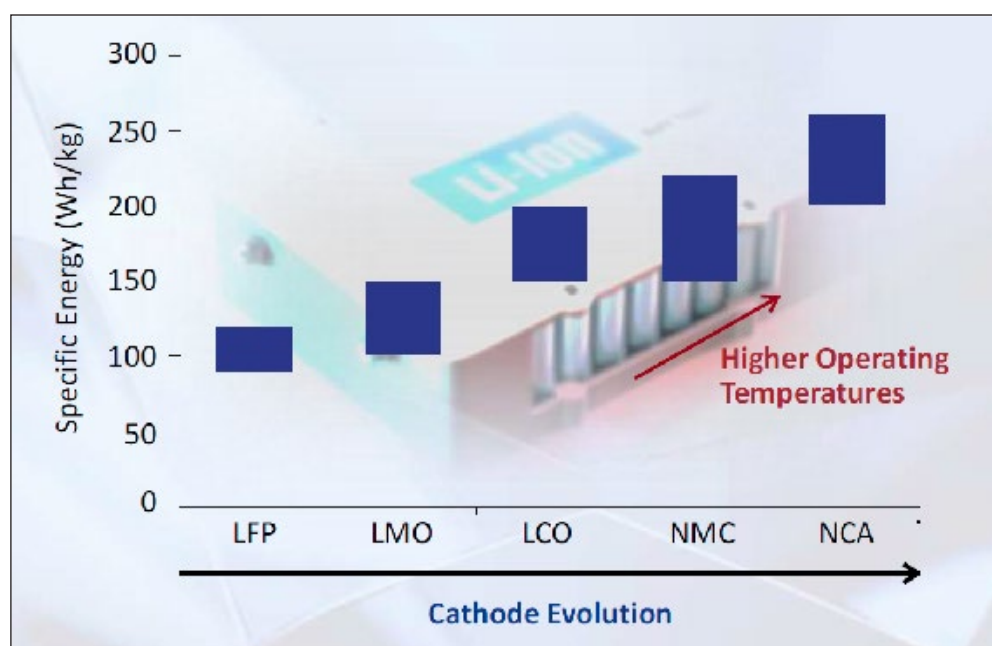
Figure 11: HPA uses



Source: Smallcaps

- ◆ However, it is expected that growth in coming years may be increasingly driven by the battery separator market, with HPA being used to coat the polymers traditionally used as the separator between the anodes and cathodes in lithium ion batteries - separators prevent the anode and cathode from shorting, however allow Li ions to pass between the anode and cathode.
- ◆ The reason for this growth in HPA coating is the growing energy density in batteries, leading to higher heat generation within them - the energy density of various battery types is shown in Figure 12.

Figure 12: Battery types and specific energy



Source: IAEA

- ◆ Traditional polymer separators are only able to handle temperatures of up to ~135° C, with HPA coated separators (HPACS) being able to withstand temperatures of over 200° C - in addition to being able to withstand higher temperatures the HPACS result in a longer battery lives, higher energy efficiencies and increased safety.
- ◆ Two main coating thicknesses are manufactured, being 1.5 um in electronics, and 2 um in electric vehicles - the estimated extra cost for a HPA separator in an EV is ~US\$200, and thus whilst being important, is only a minor cost in the production.
- ◆ The expected growth in HPA in batteries will come both from the increase in HPA coating penetration and the forecast growth in batteries, largely driven by electric vehicle uptake.

HPA PRODUCERS AND CURRENT PRICING

- ◆ Table 10 presents a list of HPA producers as of 2014, with these dominantly producing “4N” HPA, and generally being large diversified chemical producers.

Table 10: HPA producers

HPA producers		
Producer	Country	Tonnage
Sumitomo	Japan	3,020
Hebei Pengda	China	3,000
Zibo Xinfumeng	China	2,500
Sasol	South Africa	1,800
Xuancheng Jing Rui	China	1,200
Baikowski	France	1,200
Nippon Light Metal	Japan	1,100
Huantou	China	800
Dailian Rail	China	600
Others (15)	Various	3,570

Source: Technavio Research

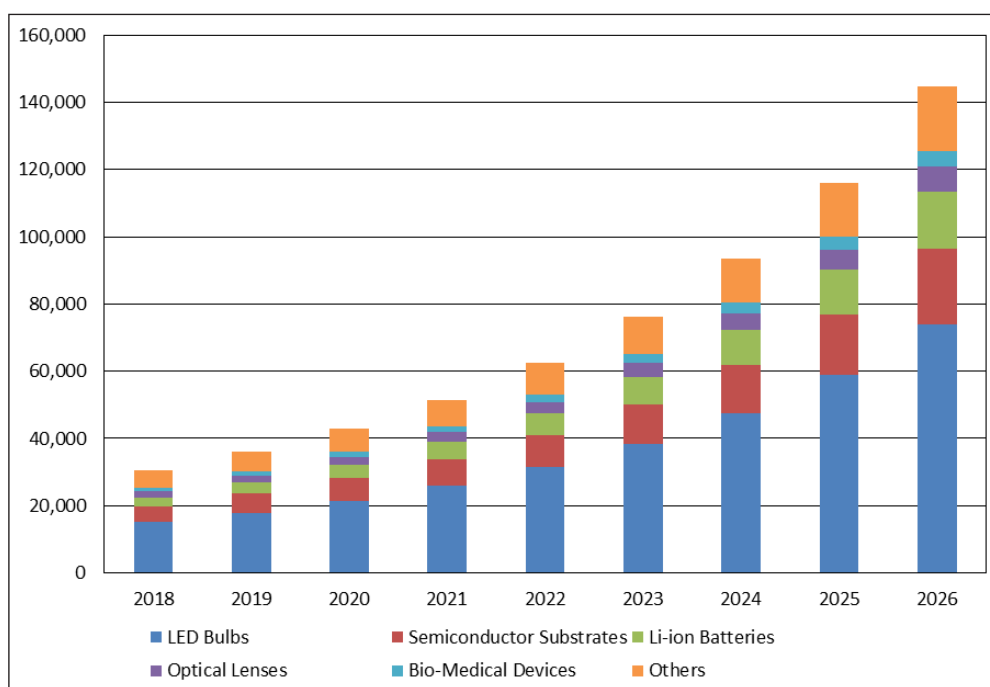
- ◆ The intense price pressure within the LED market has led to quality issues in particularly Chinese products; this in turn has placed pressure on the 4N HPA suppliers (again largely Chinese), with the result that product specifications are not consistent, and what is sometimes sold as 4N product is actually 3N.
- ◆ This has led to a binary market for 4N HPA, with a premium price group (which includes non-Chinese producers such as Sumitomo, Baikowski and Sasol), with current prices in order of US\$40/kg, and a lower price group, largely comprised of Chinese producers, with prices at around US\$20/kg - FYI is looking to be a premium producer.
- ◆ However there is the potential for Chinese producers, with the development of technology, to deliver a consistent, high quality product.

- ◆ Non-Chinese end product manufacturers tend to purchase their HPA from the premium producers to guarantee quality and consistency.
- ◆ Average prices have fallen over recent years, due to both increase in supply and production costs falling - in the case of the premium group these have fallen from ~US\$60/kg HPA to the current US\$40/kg HPA, with the lower priced group falling from ~US\$35/kg to under US\$30/kg.

DEMAND AND PRICING FORECASTS

- ◆ As mentioned, it is expected that demand growth will be driven by the battery separator coating market, with this being backed up by growth in the LED lighting substrate market.
- ◆ Growth in the separator market is expected to be driven by two main factors:
 - Growth in the battery markets themselves, largely driven by EV take-up; and,
 - Growth in the percentage of HPACS in the overall separator market - this has been demonstrated by separator producer W-Scope, with the percentage of coated vs non-coated separators increasing markedly over the last few years.
- ◆ A number of new EV battery plants and expansions to existing plants are on the drawing board, including a number in Germany - in a presentation W-Scope has outlined over 200 GWh of planned production increases over the next five years, and, allied with the increasing usage intensity could lead to a 5 to 10 x growth in this market.
- ◆ Forecasts may actually be underdone given the wish of governments to boost stimulus post COVID-19.
- ◆ The demand for LED lighting will also increase, however rates of growth are expected to slow from ~15%, however still remaining strong at ~10% per annum for the foreseeable future - Navigat Research has forecast growth from 864 million units in 2015 to 4.1 billion units in 2024, a close to 5x increase.
- ◆ Figure 13 presents the expected growth in demand for 4N HPA; the chart highlights a forecast CAGR of ~22% for 4N HPA between 2018 and 2026.

Figure 13: Forecast 4N HPA demand

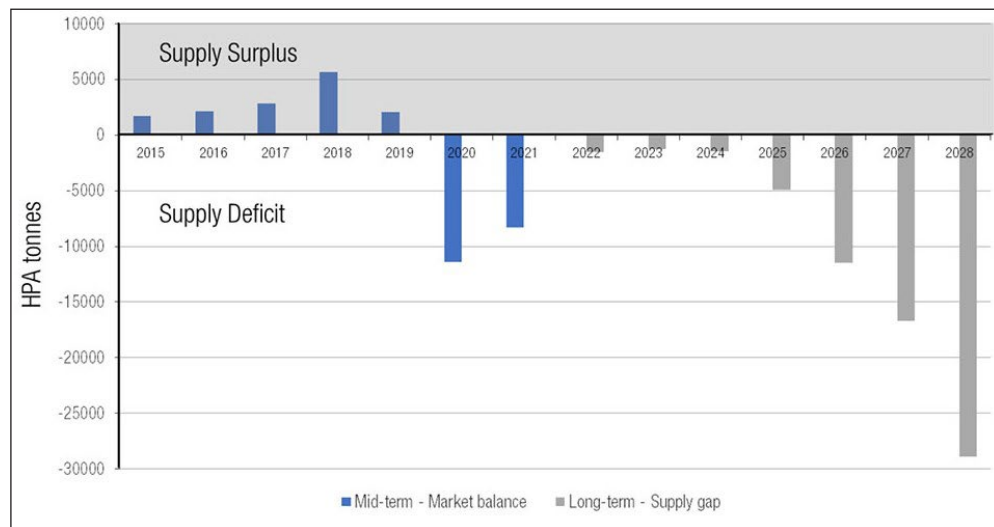


Source: CRU, from FYI DFS release

- ◆ This is also forecast to lead to a significant supply deficit, as presented in Figure 14.
- ◆ Forecasting, particularly in low volume, specialty markets is at best an inexact process, and a number of factors may affect future demand and pricing for premium 4N HPA amongst others:
 - Actual growth rates in HPACS usage intensity and EV take-up,
 - LED lighting growth,
 - Move to 5N away from 4N,
 - Improvement in quality and consistency in Chinese HPA production,

- Quantum of new supply and increases from existing producers
 - Development of replacement material for the key HPA markets; and,
 - Disruptive technology bringing costs down.
- ◆ Despite the difficulties in forecasting, we see a strong market for 4N HPA going forward.

Figure 14: Forecast HPA demand/supply balance



Source: CRU, from Stockhead website extracted November 30, 2020

DISCLAIMER

(a) Disclaimer

The information, reports, financial models, forecasts, strategies, audio broadcasts and other media (referred to as "Content" throughout this Legal Notice), provided on this web site has been prepared and issued by Altavista Research Pty Ltd trading as Independent Investment Research "IIR," Independent Investment Research Holdings Pty Ltd (ACN 155 226 074), as authorised to publish research under an Australian Financial Securities Licence (AFSL No 420170) which allows Independent Investment Research to offer financial service advice to retail and wholesale clients. Users of this web site should not act on any Content without first seeking professional advice. Whilst the Content contained on this web site has been prepared with all reasonable care from sources which we believe are reliable, no responsibility or liability is accepted by Independent Investment Research, for any errors or omissions or misstatements however caused. Any opinions, forecasts or recommendations reflect our judgement and assumptions at the date of publication or broadcast and may change without notice. Content on this web site is not and should not be construed as an offer to sell or the solicitation of an offer to purchase or subscribe for any investment. We are not aware that any user intends to rely on the Content provided or of the manner in which a user intends to use it. In preparing our Content it is not possible to take into consideration the investment objectives, financial situation or particular needs of any individual user.

Access by any user to this website does not create a client relationship between Independent Investment Research and the user. Users seeking to invest must obtain individual financial advice to determine whether recommendations are appropriate to their investment objectives, personal financial situation or particular needs, before acting on any recommendations. Any Content is not for public circulation or reproduction, whether in whole or in part and is not to be disclosed to any person other than the intended user, without the prior written consent of Independent Investment Research.

(b) Disclosure of Interest

General

Independent Investment Research, its officers, employees, consultants and its related bodies corporate have not and will not receive, whether directly or indirectly: any commission; fee; benefit; or advantage, whether pecuniary or otherwise, in connection with making any recommendation contained on this web site. Independent Investment Research, discloses that from time to time, it or its officers, employees and its related bodies corporate: may have an interest in the securities, directly or indirectly, which are the subject of these recommendations; may buy or sell securities in the companies mentioned in the Content; may effect transactions which may not be consistent with the recommendations in the Content; may have directorships in the companies mentioned in the Content; and/or perform paid services for the companies that are the subject of such recommendations.

However, under no circumstances, has Independent Investment Research been influenced, either directly or indirectly, in making any recommendations contained on this web site.

Corporate Research

Independent Investment Research has or may have, received a fee either directly by a company itself or by a third party, to provide coverage and/or corporate research (the "Fee"). Where a Fee has been received, Independent Investment Research does not publish:

Buy / Hold / Sell recommendations for the security or managed investment schemes.

(c) Copyright Protection

All Content at this web site is protected by copyright. Apart from any use permitted under the Copyright Act (Cth) 1968, you must not copy, frame, modify, transmit or distribute the material at this web site, without seeking the prior written consent of the copyright owner. Content on this web site is owned by the business Independent Investment Research. Users are prohibited from copying, distributing, transmitting, displaying, publishing, selling, licensing, creating derivative works or using any content on the web site for commercial or public purposes

Copyright 2010 Independent Investment Research. All rights reserved.

(d) Trade Marks

The trade marks and logos displayed on this web site belong to Independent Investment Research or other parties. Such trade marks include registered trade marks and trade marks pending registration. Users are prohibited from using any of these trade marks, without seeking the prior written consent of IIR or such third party, which may own the trade mark content on this web site.

(e) Limitation of Liability

To the fullest extent permitted by the law, Independent Investment Research and any of its officers, employees, agents, consultants or related bodies corporate disclaim any liability, whether based in contract, tort, strict liability or otherwise, for any direct, indirect, incidental, consequential or special damages arising out of or in any way connected with the use of any Content made available on this web site by any person or entity.

(f) No Warranties

Independent Investment Research does not make any claims, promises, guarantees, representations or warranties regarding the accuracy, completeness or fitness for purpose of the Content made available on this web site. All information on this web site is provided to you on an as is basis, without warranty of any kind either express or implied. To the extent that research can be provided by third parties, Independent Investment Research makes no warranty or representation as to the accuracy or completeness of such information displayed on this site, and accepts no liability for errors or omissions arising from such third party information. To the fullest extent permitted by law, under no circumstances will Independent Investment Research be liable for any loss or damage caused by users reliance upon information obtained through this web site. It is the responsibility of the user to evaluate the accuracy, completeness or usefulness of any information, opinion, general advice or other content made available through this web site. Furthermore, Independent Investment Research does not warrant or represent that this web site is error free or free from viruses or defects. A user must do all that is necessary (including using virus checking software) to satisfy itself that accessing this website will not adversely affect its system.

For further information, please contact IIR at: client.services@independentresearch.com.au



Independent Investment Research LLC
Independent Investment Research (Aust.) Pty Limited

DENVER OFFICE

200 Quebec Street
Suite 200
Denver Colorado 80230 USA
Phone: +1 720 355 0446

NEWYORK OFFICE

Phone: +1 917 336 0818

SYDNEY OFFICE

Level 1, 350 George Street
Sydney NSW 2000
Phone: +61 2 8001 6693
Main Fax: +61 2 8072 2170
ABN 11 152 172 079

MELBOURNE OFFICE

Level 7, 20–22 Albert Road
South Melbourne VIC 3205
Phone: +61 3 8678 1766
Main Fax: +61 3 8678 1826

MAILING ADDRESS

PO Box H297 Australia Square
NSW 1215