LAVA BLUE LIMITED

Equity Research Report – 12 August 2024

Capital Structure	
Current price per share	$0.225
Intrinsic value per share[1]	$1.012
Potential upside	350%
Ordinary shares on issue	144,676,145
Pre-money valuation	$32.5m
Options outstanding	5,955,133
Total shares and options	150,631,278

[1] Based on a DCF Valuation. See page 21

Major Shareholders	
Michael John Gregg	11.3%
Regal Funds Management	8.6%
Michael McCann	7.9%
Uwe Boettcher	5.3%
Sylvia Tulloch	4.9%
QUTbluebox Pty Ltd	4.3%

Board of Directors

- Sylvia Tulloch – Executive Chairperson
- Michael McCann – Managing Director
- Michael Ford – Executive Director
- James Palmer - Executive Director
- Uwe Boettcher – Non-Executive Director

Key Achievements To date

- Successfully developed a proprietary HPA production method that utilises any aluminous feedstock, including kaolin, aluminium hydroxide and mineral waste
- Have signed 3 licensees so far, currently generating $100k in monthly revenue
- Received $6.7m in grant funding indicative of strong federal and state support

Research Team

Nathan Oyet – Head of Research
Stuart Craigie – Associate Director

Introduction. Lava Blue is a materials science company at the forefront of the critical materials revolution in Australia. It has developed innovative methods for producing high-purity materials, with an initial focus on High-Purity Alumina (HPA). Lava Blue's proprietary HPA production method utilises hydrochloric acid to produce HPA from low-grade aluminous feedstocks, including waste streams from mineral processing. This significantly reduces costs compared to traditional methods that rely on expensive refined aluminium feedstock.

Leveraging QUT's Materials Science Research Expertise Funded with Government Grants. To develop its intellectual property, Lava Blue has collaborated with the vastly experienced materials science department at the Queensland University of Technology (QUT). This collaboration gives Lava Blue a highly leveraged, cost-effective IP engine which the company has funded with $6.7m in non-dilutive grants received from the Federal government.

A Strong Business Model Focused on a High-Margin Monetisation Strategy. Lava Blue aims to monetise its IP portfolio by licensing its IP to other critical material producers and via primary production of value-added HPA. The company has already secured three HPA licensing agreements with a strong pipeline of potential licensees both in Australia and overseas, paving the way for substantial royalty revenue in the coming years. By 2034, Lava Blue plans to establish 1,600 tonnes per annum of primary HPA production capacity, further diversifying its revenue.

Significant Valuation Upside Driven by Micro and Macro Tailwinds. Driven by expected growth in HPA demand for various applications such as LED manufacturing, we expect Lava Blue to generate $102m in revenue by 2034. With free cash flow margins expected to reach 33%, aided by heavily subsidised R&D costs, we estimate Lava Blue's intrinsic value at $146 million. This presents a substantial investment opportunity, with a potential upside of 327% compared to the current pre-money valuation of $32.5 million. Given its highly lucrative IP portfolio, robust business model, immense revenue potential, and strong management team, we believe Lava Blue presents an attractive opportunity to invest in an exceptional company well-positioned to not only drive but to benefit from the energy transition.

COMPANY OVERVIEW

Founded in 2015, Lava Blue is a materials science company focused on developing unique methods for producing high-purity materials such as High Purity Alumina (HPA). Lava Blue's strategy can be broken down into 3 key pieces, the first being its science strategy which methodically develops commercially valuable intellectual property. The second is its partnership strategy where it leverages the expertise of leading institutions such as the Queensland University of Technology (QUT) to collaborate on its research programs. Finally, Lava Blue's commercial strategy focuses on monetising its IP portfolio through a 'capital-light' licensing business model as well as the primary production of HPA and other specialty materials.

HIGH PURITY ALUMINA

HPA is a highly refined form of aluminium oxide (Al_2O_3) characterised by its purity level of 99.99% or higher. It is a critical material and is widely used in products such as LEDs, semiconductors, sapphire glass (touchscreens), and lithium-ion batteries due to its exceptional thermal stability, hardness, and high purity. It is also utilised in advanced ceramics, medical devices, aerospace components, synthetic gemstones, and optical lenses.

Lava Blue's HPA Production Method

Lava Blue employs what it refers to as the 'Modified Hydrochloric Acid Method' for the production of HPA. The majority of the HPA on the market today is either based on essentially dissolving aluminium metal and recrystallising it, or using an aluminium process waste. These methods are sometimes referred to as the solvent extraction method. Lava Blue, on the other hand, can utilise a wide range of low-grade feedstocks such as kaolin clays, mineral waste, coal fly ash and recycled aluminium, as well as aluminium hydroxide, a by-product from alumina refining.

Lava Blue produced its first HPA on 26 March 2018 from a sample of kaolin from its Lava Plains mineral resource. Following that first laboratory-scale process, the company refined the chemistry required to produce HPA from kaolin sourced from the Company's mining lease on Lava Plains in North Queensland. Over two years of work, they eventually perfected the process of purifying HPA from the range of impurities in the Lava Plains source material (an iron-rich, 'kaolinitic' assembly produced from weathered volcanic ash). Having produced high-purity alumina from this low-grade feedstock, the Company began to explore other low-grade and contaminated aluminous feedstocks from which HPA could be refined.

Lava Blue's Unique Advantage

Lava Blue's ability to utilise a variety of low-grade feedstock to produce HPA means that HPA can be manufactured as a co-product alongside other mineral processing where the waste stream or overburden contains some aluminium. This increases the supply of feedstock, much of which is readily available and often at a 'negative cost'.

Unlike conventional methods that rely on refined aluminium products as feedstock, Lava Blue's innovative process also significantly reduces the total embodied energy required to produce the finished HPA product, thus resulting in fewer emissions generated. Another advantage of Lava Blue's unique process is that the majority of the hydrochloric acid consumed in the production of HPA can be captured and recycled.

Centre for Predictive Research into Specialty Materials (PRiSM)

PRiSM (Predictive Research into Specialty Materials) is Lava Blue's advanced minerals processing and demonstration facility, located in the Redlands Bay area of South East Brisbane. The purpose of the facility is to produce samples of high-purity materials, and to inform engineering design of full-scale production facilities. Construction of PRiSM began in mid-2021 and was completed in early 2023, costing a total of $8m. Since June 2023, PRiSM has been producing 10-20kg batches of >99.99% purity HPA per week. These samples are being used by licensees for market testing and by Lava Blue to investigate options for downstream value-adding as well as to improve product control and develop product variations. PRiSM is Lava Blue's cornerstone IP-generating asset. Lava Blue's demonstration-scale HPA production facility using a hydrochloric acid route is unique in Australia and dramatically de-risks industrial scale-up of HPA production while providing sufficient material to develop markets and value-added applications for HPA.

An aerial view of the PRiSM facility where Lava Blue demonstrates its proprietary methods of producing high-purity materials, including HPA

Source: Lava Blue

QUT COLLABORATION

Overview

Lava Blue has a cornerstone collaboration with the Queensland University of Technology (QUT), where a dedicated cohort of researchers develops and translates Lava Blue-directed and funded laboratory discoveries into highly value-adding processes for critical materials.

Research Team

At the time of writing, Lava Blue's QUT research program employs 5.5 FTE post-doctoral research leads and operators, 10 postgraduate researchers, and technical staff. The program is supported by four Professorial-Level Advisors, including one 0.5 FTE.

Lava Blue has leveraged the expertise of QUT's materials scientists and researchers to develop its IP portfolio

Source: Lava Blue - The image is of Lava Blue's dedicated research team at QUT

Funding

Since 2019, Lava Blue has obtained multiple government grants totalling $6.7m, along with annual R&D tax rebates totalling more than $6m in the same period. This non-dilutive funding has heavily subsidised the QUT research program. More detail on the grants is provided under the "Grants" section.

Agreements

Collaborative Agreements. In August 2018, Lava Blue entered into an initial collaborative research agreement with QUT. This agreement was renegotiated in 2021, resulting in two parallel agreements: a Commercialisation Agreement and a Collaborative Research Agreement.

Commercialisation Agreement. This agreement was settled by the issue to QUT of 5% of Lava Blue's share capital at the time. This established the right for Lava Blue to commercialise any of the IP created in its engagement with QUT under the terms of the Commercialisation Agreement without the need for further negotiation or consideration. QUT will earn royalties of 1% on Lava Blue's first-party gross HPA sales and 5% on Lava Blue's licensing income.

Collaborative Research Agreement. This agreement establishes the right to all IP produced in the engagement between QUT and Lava Blue and is subject to the terms of the Commercialisation Agreement. All Lava Blue's staff and contractors assign all IP developed in the course of their employment with the company.

Licensing Agreements IP Protection. To protect its IP when utilised by licensees, Lava Blue's licensing agreements have an IP clawback arrangement, in which the licensee explicitly agrees that Lava Blue owns all of the engineering documentation and processes related to the implementation of Lava Blue's IP in an HPA plant.

INTELLECTUAL PROPERTY (IP)

Overview

Lava Blue's IP is generated both in the laboratories at QUT and at PRiSM and this IP encompasses know-how, trade secrets, shop floor skills, process controls, analytical instruments and methods, formulas and formulations, and patents related to its critical materials production processes.

Patent Portfolio

First HPA Method Patent - 'A Method for Producing an Aluminous Material'

- This Provisional Australian Patent describes a broad set of claims covering novel methods for producing HPA from multiple sources, controlling contaminants, particle size, and intermediate materials.
- Australian Provisional Filing, 8 June 2022, Application Number 2022901564
- International Filing, 3 June 2023, PCT/AU2023/050483

Second Patent for HPA Production from Flyash (The Sodium Control Patent) - 'A Method for Producing an aluminous Material'

- This Provisional Australian Patent describes a set of claims specifically to improve the process of recovery of aluminium from coal fly ash and reduce the effort required to remove persistent contaminants.
- Australian Provisional Filing, 29 September 2022, Application Number 2022902817
- International Filing, 28 September 2023, PCT/AU2023/050939

Third Patent for Production of High Calibrated Special Purpose Materials - 'A Method for Producing A Doped Metal Oxide'

- This patent application describes a broad method for manufacturing special-purpose oxides.
- Australian Provisional Filing, 14 February 2023, Application Number 2023900349
- International Filing, 14 February 2024, PCT/AU2024/050094

Fourth Patent for Extraction of Aluminium from Vanadium Wastes – 'A Method of Forming Alumina from Sulphate Matrices'

- This patent application covers a method developed to efficiently recover aluminium in various forms from sulphate-rich wastes such as are rejected from commonly used vanadium processing methods.
- Australian Provisional Filing, 19 June 2024, Application Number 2024901876.

BUSINESS MODEL AND GO TO MARKET STRATEGY

Overview

Lava Blue's business model revolves around two core elements: a licensing model and primary production. By focusing on these avenues, the company aims to fully maximise the value extracted from its IP portfolio.

Licensing Model

Lava Blue's strategic focus lies in monetising its distinctive intellectual property through a low-capital-intensive licensing business model. Lava Blue's licensing model for HPA production involves upfront license fees followed by

20-year royalty streams post-commencement of production. In return, Lava Blue provides core processing IP and science, test work on particular feedstocks, engineering support services, and significant foundations of know-how, trade secrets and shop floor skills, including QA/QC processes and analytical methods required to maintain and demonstrate very high purity.

Current Licensing Customers

Lava Blue currently has three licensee customers for its HPA product: Vecco Group, Critical Minerals Group (CMG), and Queensland Pacific Metals (QPM).

Vecco Group Limited

Overview. Vecco is a Queensland-based critical minerals company focused on creating a vanadium battery supply chain. Vecco operates Australia's first vanadium electrolyte plant and plans to supply vanadium flow batteries being installed around Queensland by various vanadium flow battery manufacturers.

Licensing Agreement. In May 2023, Vecco signed a licensing agreement with Lava Blue. The licensing agreement is provisional until a final investment decision is reached regarding the establishment of a 4,000 tpa HPA plant at Vecco's Debella Mine. Under the agreement, Vecco will utilise Lava Blue's technology to:

a) design, construct, operate, maintain, repair and modify an HPA plant at the Debella Mine.
b) use the feedstock at the Debella Mine to produce and sell the HPA

The agreement has a sunset clause where Lava Blue may terminate the agreement if Vecco fails to reach the final investment decision by the sunset date, which is 36 months from the commencement of the agreement (May 2026). However, Lava Blue can extend the sunset date at its own discretion.

Licensing Payments. Since the commencement of the agreement, Lava Blue has received or is expected to receive $1.25m in licensing fees from Vecco over 25 months, averaging $50,000 per month. The first payment was received in May 2023, and the last payment is expected to be received in February 2025.

Royalty Revenue Opportunity. Lava Blue is expected to receive royalties on Vecco's HPA sales for 20 years. For the first 5,000 tonnes of HPA produced per annum, a royalty rate will be applied to the incremental revenue based on the gross sales price per tonne achieved by Vecco, as set out in the table below.

Gross Sales Price (US$/t)	Royalty Rate
On the first $5,000	1.0%
On the next $5,000 up to $10,000	4.5%
On the next $7,500 up to $17,500	6.0%
On the next $7,500 up to $25,000	7.5%
On the final amount of $25,000 or higher	8.0%

Using the above royalty rate schedule, if Vecco can achieve an average HPA price of US$25,000 per tonne, Lava Blue's royalty rate will be ~5.15%. At a production capacity of 4,000 tpa and assuming an HPA price of US$25,000 per tonne, Vecco will generate annual HPA sales revenue of US$100m, implying that Lava Blue will generate annual royalty revenue of US$5.15m or AU$7.73m (AUD/USD 0.66) .

It is worth noting that Lava Blue is engaged in renegotiating the royalty rate with Vecco. This is in response to proposals from Vecco on options to improve the rate of return on their capital investment required in the early years of production. Lava Blue has proposed a 10-year rate relief reducing average royalties to 4.1% for the first decade. If this proposed rate is adopted, and using an average sale price of US$25,000 per tonne of 99.99% HPA,

Lava Blue will generate annual royalty revenue of US$4.1m (A$6.15m) in the first decade and US$5.15m (A$7.73m) (AUD/USD 0.66) in the second decade, assuming that royalty rates remain unchanged in the second decade. Vecco is expected to commence production in calendar year 2027.

Critical Minerals Group

Overview. CMG is a Queensland-based company focused on the production of critical minerals required for energy storage, electric vehicles and renewable energy. These critical minerals include vanadium and HPA.

Licensing Agreement. In October 2023, CMG signed a licensing agreement with Lava Blue. The licensing agreement is provisional until a final investment decision is reached regarding the establishment of a 4,000 tpa HPA plant at CMG's Lindfield Mine. Under the agreement, CMG will utilise Lava Blue's technology to:

a) design, construct, operate, maintain, repair and modify an HPA plant at the Lindfield Mine.
b) use the feedstock at the Lindfield Mine to produce and sell the HPA

The agreement has a sunset clause where Lava Blue may terminate the agreement if CMG fails to reach the final investment decision by the sunset date, which is 36 months from the commencement of the agreement (October 2026). However, Lava Blue can extend the sunset date at its own discretion.

Licensing Payments. Upon the commencement of the agreement, Lava Blue has received or is expected to receive $1.25m in licensing fees from CMG across 25 months, averaging $50,000 per month. The first payment was received in December 2023, and the last payment is expected to be received in October 2025.

Royalty Revenue Opportunity. Lava Blue is anticipated to earn royalties from CMG's HPA sales over the next 20 years, following the same royalty rate schedule that applies to Vecco. Using the royalty rate schedule, if CMG can achieve an HPA price of US$25,000 per tonne, Lava Blue's royalty rate will be ~5.15%. At a production capacity of 4,000 tpa and assuming an HPA price of US$25,000 per tonne, CMG will generate annual HPA sales revenue of US$100m, implying that Lava Blue will generate annual royalty revenue of US$5.15m or AU$7.73m (AUD/USD 0.66). Lava Blue expects CMG to commence production during FY27/28.

Queensland Pacific Metals

Overview. QPM (ASX:QPM) is focused on the production of critical materials for the lithium-ion battery and electric vehicle sector through its Townsville Energy Chemicals Hub (TECH) Project. QPM has a market capitalisation of $72.6m and is headquartered in Brisbane, Queensland.

Licensing Agreement. In June 2022, QPM entered into a provisional license agreement with Lava Blue to study the feasibility of Lava Blue's technology to produce HPA from QPM's feedstock which could include purchased aluminium hydroxide. Under the agreement, Lava Blue would carry out an analysis and assist QPM in developing a feasibility study for using and applying Lava Blue's technology to QPM's feedstock in an HPA flowsheet. If the feasibility study is successful, a final investment decision will be made with respect to the construction of a 4,000 tpa HPA plant using Lava Blue's technology to produce HPA from its aluminium hydroxide stream. At this point, Lava Blue will grant a new license to QPM to use its technology at an HPA plant within the TECH project.

Licensing Payments. Upon the grant of the provisional license in June 2022, QPM paid Lava Blue $1.4m plus an upfront licensing fee of $25k. Once the feasibility study is completed, Lava Blue will receive a $75k lump sum payment from QPM. Later, when the final investment decision is reached, QPM will pay a lump sum of $100k. Once QPM's HPA plant commences production, Lava Blue will receive a lump sum payment of $250,000.

Royalty Revenue Opportunity. Lava Blue is expected to receive royalties on QPM's HPA sales for 20 years. For the first 5,000 tonnes of HPA produced per annum, a royalty rate will be applied to the incremental revenue based on the gross sales price per tonne achieved by QPM based on the table below.

Gross Sales Price (US$/t)	Royalty Rate
On the first $12,500	4%
On the next $12,501 up to $25,000	5%
On the final amount of $25,000 or higher	6%

Using the above royalty rate schedule, if QPM can achieve an HPA price of US$25,000 per tonne, Lava Blue's royalty rate will be ~4.5%. At a production capacity of 4,000 tpa and assuming an average HPA price of US$25,000 per tonne, QPM will generate annual HPA sales revenue of US$100m, implying that Lava Blue will generate annual royalty revenue of US$4.5m or AU$6.75m (AUD/USD 0.66). On April 22, 2024, QPM announced a shift in strategy, reducing expenditure on its TECH project to concentrate on developing its gas and energy assets. Consequently, Lava Blue does not anticipate QPM to begin production in the near future. However, given the high rate of return from the HPA component of the TECH project, Lava Blue anticipates QPM to either proceed with the project independently or sell it to another party.

In July 2024, QPM announced that it had received an $8 million grant from the Federal Government to assist with the costs of completion of a bankable feasibility study for its TECH Project under the Federal Government's International Partnerships Program grants aimed at supporting the production of critical minerals. A few days later QPM announced that it had received an $8 million grant from the Queensland Government, effectively doubling the Federal Government grant. The Company then announced that they were considering demerging the TECH Project from the energy-focused side of their business. Lava Blue is kept closely informed of these corporate developments by QPM, as Lava Blue has to agree to any assignment or transfer of the underlying license agreement.

Sales Pipeline

Overview. Lava Blue has several options for entering into new licensing arrangements in Australia and overseas. Although it is not actively growing its opportunity pipeline for more potential licensees (as the focus is on managing the test work and engineering support for the current suite of licensees), Lava Blue plans to sign two more licenses in the second half of 2024 (for a total of five active licenses).

Near-Term Licensee Opportunities. Lava Blue has near-term and medium-term plans to increase its cohort of licensees. Lava Blue plans to close a licensing deal by the end of 2024 with a kaolin producer. There are ASX-listed companies operating kaolin production and export mines who are potential licensees, and there are opportunities overseas with international kaolin producers. Separately Lava Blue has close relations with another contender in the north-west Queensland vanadium province. Boomarra Minerals Ltd is a company that was demerged from Lava Blue in 2022 and holds several hundred square kilometres of the vanadium-enriched Toolebuc Formation. Boomarra Minerals has a presumptive right to enter into a licence should it choose to progress HPA manufacturing from any source once the company is listed on the ASX.

Kaolin Prospects. Lava Blue has also been exploring licensing opportunities within the kaolin industry where HPA can be a co-product of high-quality kaolin mining and processing. IG Mining Ltd, a pre-IPO kaolin and gold mine developer in North Queensland, has expressed interest in an HPA licence, and Lava Blue has conducted test work and manufactured HPA for them in the laboratory from their Kaolin. Lava Blue has made HPA through test work for Mota Ceramics, a kaolin producer in Portugal, and has been invited to visit the UK and EU as a guest of the Critical

Minerals Association to look for partnerships in Europe. Lava Blue has also performed HPA test work for ASX-listed kaolin-focused companies as far back as 2019, and it will pursue a number of opportunities among the kaolin producers and project developers in Australia in the second half of CY24.

Long-Term Sales Expectations. Given the strong market demand for HPA, Lava Blue plans to have a minimum of 20,000 tonnes of HPA production under license by 2030 and as much as 30,000 tonnes per annum by 2034. Assuming an HPA price of US$25,000 and an average royalty fee of 4.5%, Lava Blue expects to generate recurring royalty revenue of ~AU$34m in 2030 and ~AU$51m in 2034. Lava Blue expects two of its three current HPA licensees, totalling a potential 8,000 per annum, to be in production by FY27-28. The overall commercial framework of the licensing strategy ensures that Lava Blue is rewarded by its licensees for producing and maintaining high-quality products that achieve higher-end prices.

As a low cost method for identifying potential North American licensees, Lava Blue has engaged with a large US-based consulting engineer with a large EPCM pipeline of projects in North America. This relationship is in its early stages; however, it is expected that the US entity will actively look for at least one North American licensee for Lava Blue during the second half of CY24.

Primary HPA Production Opportunity

Sole Supplier Strategy. In early 2024, Lava Blue embarked on a sole supplier strategy aimed at partnering with startups that require HPA in the tens of kgs to low hundreds of kgs to be utilised in niche and new applications, such as medical implants, engineered ceramics and battery manufacturing. Lava Blue plans to grow with these start-ups as they scale the production of their products that require HPA. The supply of HPA will be delivered by PRiSM. In line with this strategy, Lava Blue has partnered with two battery manufacturing start-ups in Australia, both of whom will need increasing volumes of HPA. One partner is manufacturing high-performance lithium-ion cells, which require specifically optimised ceramic-coated separators. The other partner is building sodium-ion batteries and requires HPA for certain elements of the battery architecture. Lava Blue is also developing relationships with HPA users in Europe who require tens to hundreds of kilograms annually for specialised applications.

Industrial-Scale Plant at Redlands. To ensure a sufficient supply of HPA to its sole supplier partners, Lava Blue plans to establish a small commercial-scale 400-500tpa plant in Redlands at the same location as PRiSM. HPA produced at the plant will be directly sold to the sole supplier partners and other customers who will need very high specification HPA, priced above the market average at US$25,000 per tonne. At this price, the 400tpa plant is expected to generate approximately A$14m to A$15m in annual gross revenue. At estimated EBITDA margins of ~30%, this implies EBITDA of A$4.2m to A$4.5m. Lava Blue estimates that constructing the plant will cost between A$12m and A$15m, with construction anticipated to commence in the second half of 2025. The company is currently working with its engineers to design the plant and develop a project budget and construction timeline.

It's worth noting that Lava Blue's license arrangements do not prohibit or limit Lava Blue from producing HPA on its own account. While Lava Blue is supporting licensees' entry to global markets with their HPA production, the Company believes that the growth and diversification of the HPA market will provide high-value niche opportunities that Lava Blue can address that will not put it in competition with its licensees. Additionally, under its licensing agreements, Lava Blue has imposed an 'IP Clawback' arrangement where all engineering and any innovation developed in the course of designing licensee production plants belongs to Lava Blue. This means that if its licensees establish their HPA plants, Lava Blue will acquire valuable insights that it could then apply to the engineering and design of its own plant.

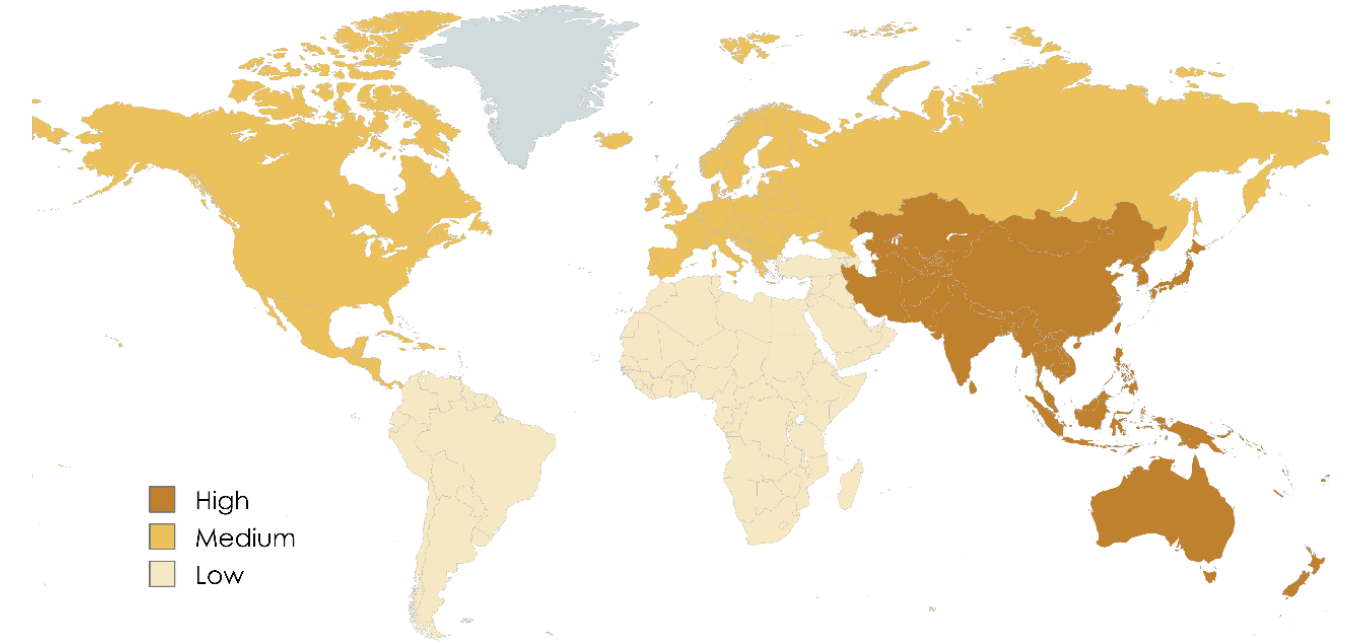
MARKET ANALYSIS

HPA Market

General Market Research. According to Mordor Intelligence[i], the global HPA market is expected to reach 70,400 tonnes by the end of 2024 and grow at a CAGR of ~22% to reach 190,000 tonnes by 2029.

Other Market Research. In their feasibility study, Alpha HPA, Australia's only other operating HPA producer, provided market research performed by CRU Group that indicated that the global demand for 4N HPA (99.99% purity) could grow at a CAGR of 31.6% from 35,000 tonnes in 2018 to 500,000 tonnes in 2028. However, using a more realistic 'supply constrained' demand forecasting model that accounts for expected supply inadequacies, CRU expects the HPA market to grow at a CAGR of 17.6% to reach 177,000 tonnes by 2028. Assuming a price of US$25k per tonne, the HPA market is expected to reach ~US$4.4 billion by 2028.

HPA Market Growth Rate by Region



Source: Mordor Intelligence

Market Growth Drivers. The strong expected growth in the HPA market is underpinned by the growing demand for LEDs and Lithium-ion batteries. HPA is utilised in the manufacture of sapphire glass used in LEDs, which are experiencing increased demand across various applications such as lighting, micro-LEDs for high-definition screens, and LEDs integrated into smartphones and EVs. On the other hand, HPA is also used in ceramic-coated separators for high-performance lithium-ion batteries, which is growing in step with the growth in Li-ion battery manufacturing. The use of HPA for new applications, such as sodium ion batteries, is also expected to contribute to increasing demand.

Lava Blue's Target Market

Thus far, Lava Blue has directed its licensees towards the production of HPA for the LED market given it consumes the largest portion of HPA and has less demanding specifications compared to other HPA applications. In the battery end of the HPA market, though in the early stages, Lava Blue is actively collaborating with partners to understand what is required to make ceramic-coated separators and solid-state battery ceramics.

HPA Competitive Landscape

Lava Blue faces competition from primary HPA producers and companies focused on creating innovative methods of HPA production for licensing to existing or potential producers. Our research has not identified any specific companies in the latter category. However, within the primary HPA producer group, several companies have independently developed or purchased their own HPA production techniques with the intention to produce HPA. These companies could increase the supply of HPA in the market, potentially reducing the demand for HPA produced by Lava Blue's licensees, thereby impacting royalty revenue. Alternatively, these companies could directly compete with Lava Blue for the supply of HPA. These direct competitors include Alpha HPA Ltd (ASX:A4N), Cadoux Ltd (ASX:CCM), and Chemx Ltd (ASX:CMX). Despite the presence of direct competitors, the forecast supply shortage in the HPA market is expected to minimise the risk of intense competition among producers.

OTHER HIGH PURITY MATERIALS

Overview

Outside of HPA, Lava Blue is actively investigating a number of avenues for marketing high-value products into emerging markets for high-purity battery and solar-grade materials. Lava Blue contends that the fundamental principles and capabilities underlying hydrochloric acid purification of HPA have broad applications in mineral processing and materials synthesis and can achieve degrees of purity that are usually unattainable using conventional processing methods. The two broad high-purity material pathways being explored by the company are the production of metal salts and the use of halides.

Metal Salts via the Chloride Route

Lava Blue's expertise in using hydrochloric acid for the production of HPA opens up the possibilities for using hydrochloric acid processes to manufacture a range of 'metal salts'. The company states that this 'metal salts' route could include, for instance, vanadium and some industrial metals from wastes, depending on the source. Lava Blue is currently investigating a chloride route to extract and purify vanadium. This approach has the potential to produce vanadium chloride, an ingredient of mixed acid vanadium flow batteries, directly from the raw ore without first manufacturing vanadium pentoxide as is now the common practice.

Halides Chemistry

Lava Blue is exploring methods for the manufacture of various halide compounds for use in perovskite solar cells. Perovskite solar cells are a type of photovoltaic technology with the potential for high-efficiency and low-cost manufacturing. While the instability of the perovskite solar cell when exposed to water and oxygen has limited their adoption to date, recent advancements in perovskite cell fabrication and advancements in halide chemistry are expected to increase their viability.

Additionally, the proposed use of a perovskite layer on some silicon solar cell architectures is expected to increase demand for the inputs to perovskite manufacturing. In June 2024, Lava Blue and QUT were awarded a $588,750 grant under the federal government's Australian Research Council (ARC) Linkage Project scheme to investigate the production of perovskite precursors from Australian minerals and to demonstrate at scale the production of bespoke precursors.

Other High-Purity Materials Business Strategy

Similar to its business model for HPA, Lava Blue plans to license its proprietary production methods to other companies. However, if it identifies and develops any very lucrative methods for manufacturing a high-value, high-purity material, the company would be open to becoming a primary producer.

GRANTS

Overview

To fund its research and operations, Lava Blue has capitalised on non-dilutive grant funding. These grants have provided the company with a high-leverage means to develop its unique and commercially viable IP portfolio. The two most significant grants Lava Blue has received are the Critical Minerals Accelerator Initiative (CMAI) grant and the Innovative Manufacturing CRC Ltd (IMCRC) grant.

CMAI Grant (Ongoing)

Overview. In March 2022, Lava Blue was awarded a matched funding grant of $5,237,976 under the Critical Minerals Accelerator Initiative, which is run by the Australian Department of Industry, Science and Resources. The grant commenced on 1 December 2022 and runs to 31 March 2025. The matching component of the grant implies that Lava Blue has to invest an amount equal to the grant, thus bringing the total project investment to $10,475,952.

Grant Purpose. The primary purpose of the CMAI grant is to help Australian critical minerals projects contribute to supply chains of strategic importance. Lava Blue is utilising the grant to finance a range of activities at PRiSM, including assisting with the costs of commissioning and operating the pilot plant, procuring some hardware, and developing a machine learning capability at PRiSM.

Payment Schedule. As of the date of this report, the grant had provided direct payments of $3,928,481 to Lava Blue, which the company matched. Over the next 12 months, the grant will provide a further $1,309,495, which will also be matched by Lava Blue. The table below details the payment schedule for the grant funding.

Payment Event	Anticipated Payment Date	Payment Amount
Initial Payment	14/12/2022	$523,797
Progress Payment	12/06/2023	$1,309,494
Progress Payment	27/10/2023	$1,047,595
Progress Payment	15/03/2024	$1,047,595
Progress Payment	26/07/2024	$523,798
Progress Payment	11/12/2024	$523,798
Final Payment	30/05/2025	$261,899
Total		$5,237,976

IMCRC Grant (Completed)

Overview. In June 2019, Lava Blue and QUT were awarded a matched funding grant of $645,591 from the Innovative Manufacturing CRC (IMCRC), a cooperative research centre that helps Australian manufacturing companies increase their global relevance through research-led innovation. During the course of the grant funded work, which took place primarily across COVID affected years, applications to the IMCRC for variations increased the total matched grant amount to $1,521,232. The grant commenced on 23 September 2019 and concluded on December 1, 2022.

Grant Purpose. The primary purpose of the IMCRC grant was to fund the establishment of an optimised HPA processing plant and further develop Lava Blue's HPA manufacturing process from low-grade clay (kaolin) resources. Lava Blue initially used the grant to build a 1kg batch HPA pre-pilot plant at QUT. The grant was also used, to a lesser extent, to invest in the design of PRiSM and procure some hardware.

GOVERNMENT SUPPORT FOR THE CRITICAL MATERIALS INDUSTRY

Funding Initiatives

Federal Budget. In the Federal 2024-25 budget, the government announced support for the Australian critical minerals processing industry through the new Critical Minerals Production Tax Incentive ($7 billion over 11 years). The incentive will give a 10% refundable tax offset for the eligible costs of processing critical minerals in Australia[ii].

National Battery Strategy. On 23 May 2024, following the announcement of the federal budget, Australian Prime Minister Anthony Albanese announced the $543.5m National Battery Strategy[iii]. At its core, the strategy is focused on funding the development of battery fabrication capabilities through direct grants and production incentives targeted at the highest-value opportunities in the supply chain, such as critical minerals. Prime Minister Albanese made the announcement during a visit to QUT's Advanced Battery Facility in Brisbane, where Lava Blue has been an active participant in research and skills development for several years. Lava Blue has stated that it had a hand in drafting the strategy.

Michael McCann, CEO of Lava Blue, guides Australian Prime Minister Anthony Albanese on a tour of QUT's Advanced Battery Facility in May 2024

Source: Lava Blue

Lava Blue's Key Political Relationships

To ensure continued success in securing non-dilutive capital from government funding initiatives, Lava Blue has focused on developing strong relationships and contacts within both the federal and Queensland governments. Previously, the company has leveraged these contacts to obtain non-dilutive grant funding, such as the CMAI and IMCRC grants and has other grant applications underway and under consideration.

MINERAL RESOURCES

Overview

Besides its critical materials business, Lava Blue holds more than 1800sq km of exploration leases in northeast Queensland through three wholly owned subsidiaries: Mt Rosey Mining Company Pty Ltd, Cloncurry Industrial Minerals Pty Ltd, and North East Lithium Pty Ltd. In 2022, Lava Blue spun out one of its subsidiaries, Boomarra Minerals. Michael McCann (Lava Blue CEO) has stated that the company plans to spin off some of its mineral resource subsidiaries where appropriate to accelerate mineral asset development, generate returns to shareholders and recover cash where possible to fund the core materials science business.

Mt Rosey Mining Company Pty Ltd

Lava Blue was incorporated in 2015 to take over the Mt Rosey Mining Company Pty Ltd, a company that at the time held exploration permits across areas of north Queensland that were prospective for various critical minerals. The table below shows the details of the 3 exploration licenses Mt Rosey Mining Company Pty Ltd holds.

Mineral	Identifier	Project Name	Status	Area
HPA/Sapphire	EPM 18455	South Terrace HPA and Sapphire	Granted	189 sq km
Titanium Niobium REE	EPM 19575	Broken Vent Ti-Nb REE	Granted	144 sq km
Volcanic Hosted REE	EPM 13191	Mt Rosey McBride Basalts	Granted	102 sq km

A JORC-compliant measured resource of 7.6 million tonnes of clays grading 28% AL_2O_3 has been defined on the Mt Rosey permits. This was the resource on which Lava Blue developed the original HPA refining process with QUT. This resource gives Lava Blue the option to produce HPA from its own clay resources should that course of action become warranted at any time in the future.

Cloncurry Industrial Minerals (CIM) Pty Ltd

Cloncurry Industrial Minerals Pty Ltd holds 3 exploration permits covering resources that are prospective for high-purity quartz. The table below shows the details of the exploration permits held.

Mineral	Identifier	Project Name	Status	Area
High Purity Quartz	EPM 26161	HJ Reef HPQ	Granted	12 sq km
High Purity Quartz	EPM 27915	HJ Reef Eastern Extension	Granted	9 sq km
High Purity Quartz	EPM 28572	Cloncurry North HPQ	Application	30 sq km

A JORC-compliant measured, indicated and inferred resource of 4.65 million tonnes of high-purity quartz has been defined on the CIM permits at Cloncurry. Subsequently, an additional contiguous permit was granted that has an estimated further 1.6 million tonnes of high-purity quartz.

Cloncurry's high-purity quartz could be accessed for supply to a silicon metal furnace. Lava Blue is in negotiation with a potential off-taker of smelter-ready rock lump quartz and plans to sell a controlling interest in CIM after the off-take terms have been settled.

North East Lithium Pty Ltd

North East Lithium is a wholly owned subsidiary with a set of four closely spaced permits covering more than 1100 sq km across an area known as the Chillagoe gold province. These permits have a wide range of historical small-scale mines recorded, including tin, tungsten, gold, copper, lead and molybdenum. The table below shows the details of the exploration permits held.

Mineral	Identifier	Project Name	Status	Area
Tin, Tungsten, Lithium	EPM 28132	Undara North	Granted	234 sq km
Tin, Tungsten, Lithium	EPM 28134	Amber Creek Critical Minerals Project	Granted	300 sq km
Tin, Tungsten, Lithium	EPM 28141	Ironclad Critical Minerals Project	Granted	297 sq km
Tin, Tungsten, Lithium	EPM 28144	Mt Pudding Critical Minerals Project	Granted	300 sq km

Lava Blue is considering either selling or de-merging North East Lithium at the end of calendar 2024 via an in-specie distribution of its shares to shareholders, as it has previously done with Boomarra Minerals Ltd.

Boomarra Minerals

Boomarra Minerals Ltd is a related company that was spun out of Lava Blue in December 2022 for the purpose of progressing several highly prospective exploration projects originally secured by Lava Blue. Boomarra Minerals has applications in place, expected to be granted in the next few months, for exploration permits over large areas of the Toolebuc Formation in northwest Queensland, where Vanadium and HPA could be sourced if circumstances support this course of action. Additionally Lava Blue has transferred to Boomarra two significantly mineralised EPMs on the northern edge of the Greenvale nickel district and on the southern edge of AUZ's Sconi nickel and cobalt project area. The table below shows the details of the exploration permits held.

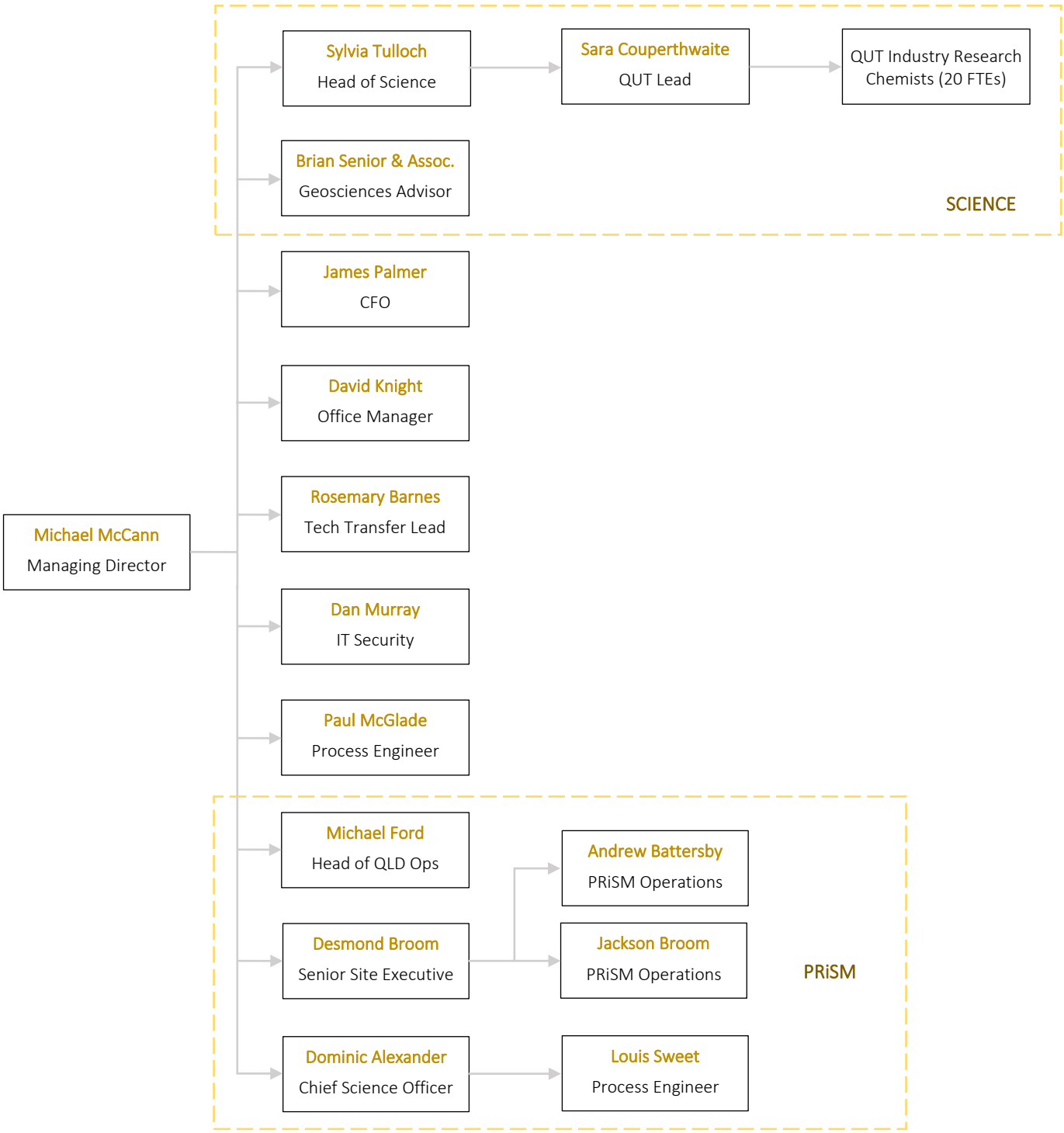
Mineral	Identifier	Project Name	Status
Manganese Cobalt Nodules	EPM 27048	Four Ways Manganese Cobalt Project	Granted
Deep Sulphides	EPM 27715	Four Ways Manganese & Sulphides	Granted
Deep Sulphides	EPM 28699	Four Ways South Sulphides	Application
Toolebuc Vanadium REEs	EPM 28573	Lilyvale Project	Application
Toolebuc Vanadium REEs	EPM 28646	Wilgunyah	Granted
Tungsten, Zinc, Lead, Silver	EPM 28076	Perry Creek Critical Minerals Project	Granted
Tungsten, Nickel, Cobalt	EPMA 28734	Lincoln Spring Perry Creek Extension	Application

ORGANISATIONAL STRUCTURE

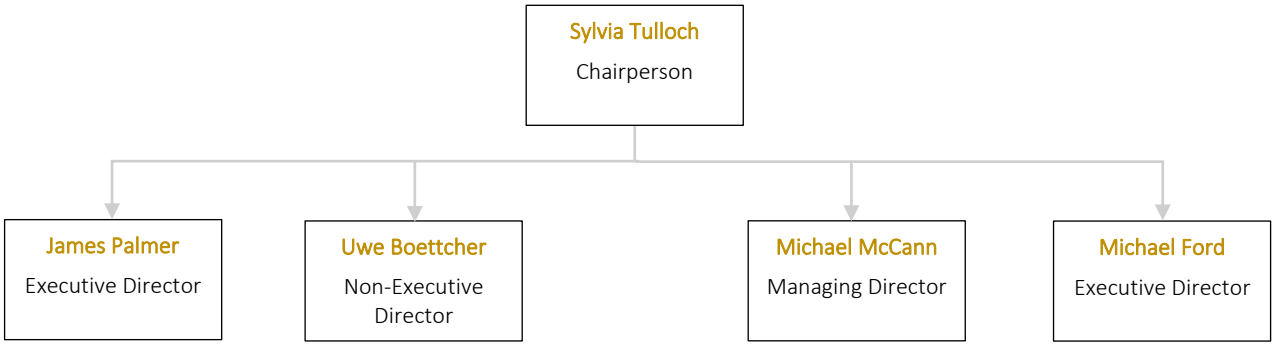
Company Structure

Lava Blue Ltd is the corporate entity that owns all vital critical materials processing IP and receives income from license fees and grants. Lava Blue Ltd also 100% owns three subsidiary companies: Mt. Rosey Mining Company Pty Ltd, Cloncurry Industrial Minerals Pty Ltd, and North East Lithium Pty Ltd.

Organisational Chart



Board Structure



Capital Structure

Lava Blue currently has 144.68 million ordinary shares on issue before the capital raise. The top 20 shareholders hold 63.8% of the outstanding shares. Michael Gregg is the largest individual shareholder, directly and indirectly owning 11.3% of the outstanding shares. Regal Funds Management is the top institutional shareholder, with 8.64% of the outstanding shares. The table below lists the top 20 shareholders.

Shareholder Type	Name	Total Shares	Percentage
Company	Merrill Lynch (Australia) Nominees Pty Ltd	12,500,000	8.64%
Joint	Suzzane Jane Gregg	8,933,340	6.17%
Company	FINER CHINA PTY LTD (Michael McCann)	7,805,645	5.40%
Company	UDB PTY LTD (Uwe Boettcher)	7,628,170	5.27%
Individual	Michael John Gregg	7,400,000	5.11%
Company	QUTbluebox Pty Ltd	6,261,209	4.33%
Company	DECLAST PTY LTD (Sylvia Tulloch)	3,941,845	2.72%
Individual	David John Muir	3,907,433	2.70%
Joint	Shane Anthony Matchett	3,608,313	2.49%
Company	ETONWOOD SECURITIES PTY LTD	3,560,000	2.46%
Company	Prime Energy Developments Pty Ltd (Michael McCann)	3,552,460	2.46%
Individual	Alison Jean Gilroy	3,444,800	2.38%
Company	Sylvia Tulloch Pty Ltd (Sylvia Tulloch)	3,132,446	2.17%
Company	Prospect Custodian Ltd	3,125,000	2.16%
Company	ICMAAM Pty Ltd	2,525,000	1.75%
Individual	Brian Senior	2,506,457	1.73%
Company	APAM HOLDINGS Pty Ltd	2,375,000	1.64%
Individual	Edward Michael Pain	2,051,000	1.42%
Company	Cognitus Pty Ltd	2,000,000	1.38%
Individual	Shirley Elizabeth Webb	2,000,000	1.38%
Top 20 Shareholders		92,258,118	63.77%
Total Shares Outstanding		144,676,145	100.00%

FINANCIALS

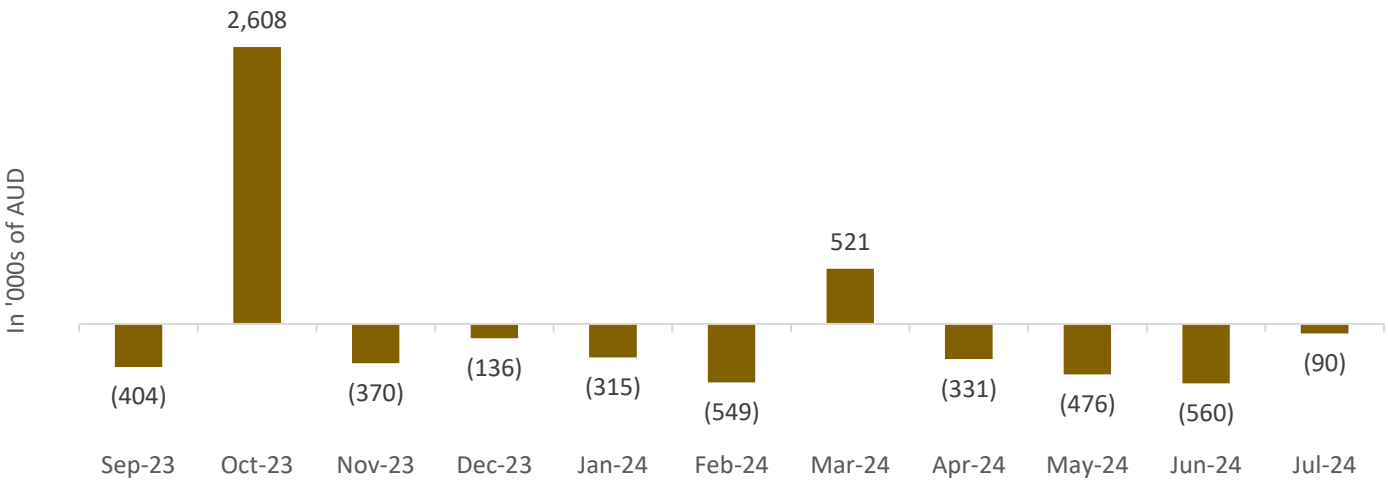
Financial Performance

Employee Expenses. Lava Blue currently has 9 salaried employees on its payroll. The monthly compensation (including PAYG and Super) paid to these salaried employees is ~$67,000. Lava Blue also has 6 people on its board, including an executive chairperson, 3 part-time executive directors, and the managing director. The monthly compensation of the board (including PAYG and Super) is ~$57,000. The two highest-paid people at the company are Michael McCann (Managing Director), who earns ~$213k annually (~$18k) per month and Sylvia Tulloch (Non-Executive Chairperson), who earns ~$140k annually (~$12k) per month. In aggregate, Lava Blue has direct employee expenses of ~$124k per month.

Research Expenses. As part of its QUT collaboration, Lava Blue funds the research activities of a team of material scientists and technical staff. Although the monthly research expenses of this research team may vary month to month based on hours and days worked, the research expenses for this team are ~$110k per month. In addition to the QUT research team, Lava Blue funds the Australia Research Council Project (LP 210200938), which is scheduled to run between November 2022 and November 2026. This project is led by Dr Rachel Pepper and is focused on exploring the doping of alumina with tailored material properties for battery applications. Lava Blue's cash contribution to the project is $60k per annum (~$5k per month). In aggregate, Lava Blue's research expenses for these 2 research programs are ~$125k per month.

Monthly Burn. In addition to employee expenses and expenditure on research, Lava Blue incurs corporate overhead expenses and costs related to the operation of PRiSM, i.e. consumables and reagents. Based on Lava Blue's internal financial model, the company's monthly expenses are estimated to be ~$450k. This is partially offset by ~$100k in monthly licensing revenue, which implies that Lava Blue's monthly burn rate averages ~$350k. It is noteworthy that Lava Blue also benefits from substantial non-recurring grant payments and annual tax rebates, which lead to positive cash flows in the months when these payments are received.

Monthly Cash Burn (Surplus)



Source: Lava Blue

Financial Position

As at 1 June 2024, Lava Blue had $1m in cash at bank. With the $2.5m capital raise, Lava Blue could extend its runway till October 2025 before another capital raise is required. As of the end of FY23, Lava Blue had ~$740k in debt, which was entirely repaid upon receipt of a ~$1.85 million R&D Tax rebate in October 2023. Lava Blue has standing arrangements with select shareholders that enable borrowings in the last quarter of the financial year to be put in place against future R&D Tax rebates that allow the company to bring forward purchases of capital goods required for research (instrumentation, reaction vessels and other eligible expenditure) and increase their claimable expenses when completing their annual tax returns, making for very efficient capital investment processes.

Capital Raise

Lava Blue is issuing 11 million ordinary shares at $0.225 to raise $2.5m at a pre-money valuation of $32.5m. Below is the use of funds raised;

- ~$1m – Matching funds for the vanadium and HPA production CMAI-focused grant
- $900k – Working capital and preparation for IPO
- $400k – Other capital and operating costs at PRiSM
- $200k – Ongoing exploration and resource development costs

The funds raised are projected to sustain the company's operations well into 2025. Depending on the company's success in securing additional licensees later this year and early next year, a pre-IPO capital raise might be required.

Planned IPO in 2025

Lava Blue plans to list on the ASX by the end of September 2025. This will offer a liquidity event for both existing and new investors involved in the current funding round. By achieving key milestones, such as securing additional licensees, Lava Blue aims to build momentum leading up to the IPO to ensure that its valuation on the public markets accurately reflects the company's strong financial prospects.

VALUATION

Overview

A discounted cash flow (DCF) model has been used to derive a valuation for Lava Blue. The fundamental assumption underpinning this valuation is that Lava Blue will generate revenue from licensing out its HPA-related IP and engaging in primary HPA production through its planned 400 tpa modular plants. The DCF uses a 10-year forecast period, i.e., FY25 to FY34.

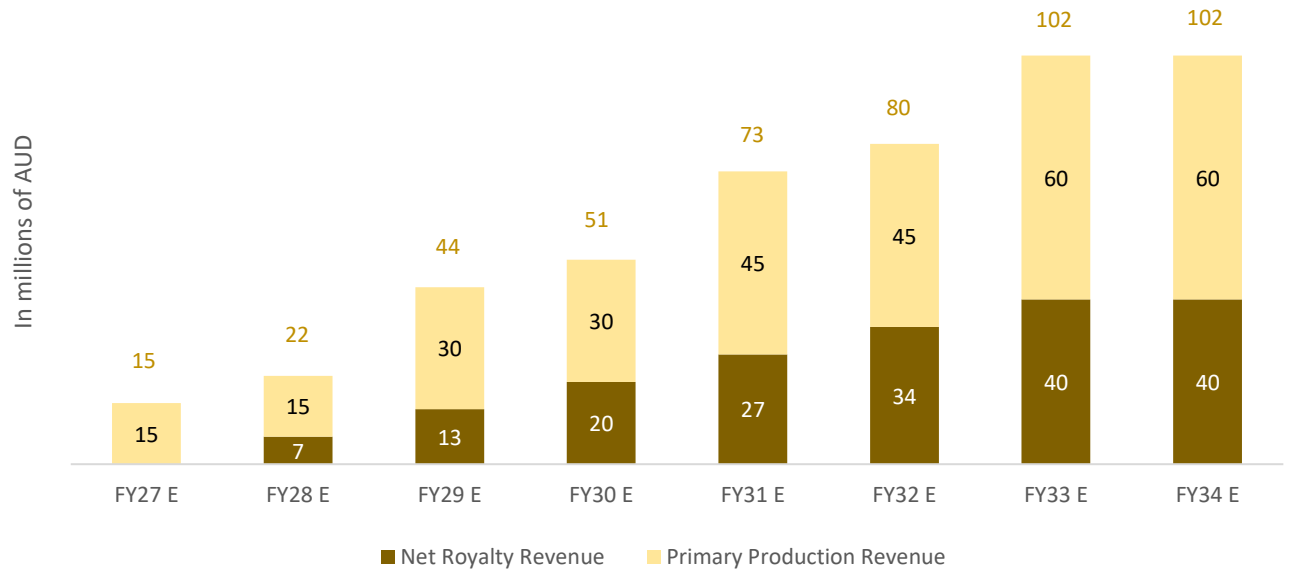
Revenue

Net Royalty Revenue. Based on its current licensing agreements, Lava Blue's first licensees are expected to commence production during FY28. Production from this first group of licensees is conservatively estimated to be 4,000 tpa. We then expect Lava Blue's licensee production to grow by 4,000 tpa annually between FY28 and FY33. Licensee production is anticipated to reach 24,000 tpa in FY34, a conservative estimate relative to Lava Blue's license production target of 30,000 tpa by the same year. We expect growth to be underpinned by the signing of additional licensees as well as the growth in existing licensee production. Based on its licensing agreements, we expect Lava Blue to earn a royalty fee of ~4.5% on licensees' gross HPA sales revenue. Assuming an HPA price per tonne of AU$37k (US$25k), Lava Blue is expected to generate $6.7m in royalty revenue in FY28 growing to $40.3m

in FY34. According to its commercial agreement with QUT, Lava Blue has to pay QUT 5% of its royalty revenue. This leaves Lava Blue with net royalty revenue of $6.4m in FY28 and $38.3m in FY34.

Primary HPA Production Revenue. We expect Lava Blue's modular 400 tpa plant to commence production in FY27, yielding gross sales revenue of $14.9m at a price of US$25k (A$37k) per tonne of HPA. Subsequently, driven by forecast growth in national and global HPA demand, we expect Lava Blue to add 400 tpa in production capacity in FY29, FY31 and FY33. In FY34, production is forecasted to reach 1,600 tpa, yielding annual gross revenue of $59.7m.

Driven by its licensing and primary production businesses, Lava Blue's revenue is expected to experience significant growth between FY27 and FY34



Source: Canary Capital Estimates

Operating Income

Primary HPA Production. Lava Blue expects to generate EBITDA margins (operating margins) of 30% from primary HPA production. However, due to the initial ramp-up in capacity utilisation during FY28, we expect EBITDA margins during this year to be 20%. The plant is expected to run at full capacity in FY28 through to FY34 during which EBITDA margins are forecasted to reach 30%. Operating income for the forecast period is derived by deducting depreciation expenses from EBITDA. For every 400 tpa in production capacity added, we estimate capex of ~$12.5m with a useful life of 20 years, resulting in an annual depreciation expense of $625,000 for every 400 tpa in capacity.

Subsidised Operating Expenses and Consolidated Operating Income. To calculate Lava Blue's consolidated operating income, we have estimated the company's subsidised operating expenses. Subsidised operating expenses are defined as operating expenses, i.e. corporate overhead and research program costs, minus grants, subsidies, and R&D tax incentives received. We believe that subsidised operating expenses, as opposed to reported operating expenses, more accurately reflect a core aspect of Lava Blue's business model, which leverages non-dilutive capital to subsidise its research programs. Lava Blue's subsidised operating expenses were $2.9m and $3.4m in FY23 and FY22, respectively, versus operating expenses of $6.5m and $5.8m in FY23 and FY22.

We have assumed that Lava Blue's subsidised operating expenses will grow by 10% annually during the forecast period to reach $8.4m in FY34. To calculate Lava Blue's consolidated operating income, we have added operating income from primary HPA production to net royalty revenue and then deducted subsidised operating expenses. This has resulted in a consolidated operating income estimate of $47.2m in FY34, an operating margin of ~47%.

Free Cash Flow

Net Income. Due to Lava Blue's tax losses amounting to $6.6m, we anticipate that the company will not incur any corporate tax liabilities between FY25 and FY28. Consequently, net income during this period is projected to be equivalent to operating income. However, we expect these tax losses to be fully exhausted by FY29, after which Lava Blue will likely start paying corporate taxes at a rate of 30%. The company is forecasted to generate a net income of ~$33m in FY34, reflecting a net margin of ~33%.

Free Cash Flow. To derive the company's cash flow, capital expenditure was deducted from net income, while depreciation, a non-cash expense, was added back. We anticipate that the $60m investment made in establishing 1,600 tpa in production capacity will be the only significant capex Lava Blue will incur during the forecast period. Adjustments to net income for capex and depreciation resulted in a free cash flow estimate of ~$33.7m in FY34.

Equity Valuation

Intrinsic Value. Lava Blue's free cash flow over the forecast period was discounted to its present value using a 12.5% discount rate, resulting in a total of approximately $27m. Applying a terminal growth rate of 3.5%, the company's terminal value, discounted to present day, was estimated at around $119.2m. By summing these figures, Lava Blue's enterprise value was calculated to be $146m. This enterprise value was then adjusted by a pre-raise cash balance of ~$1m and debt of $742k to yield an equity value of $146.4m. This equity value implies a potential upside of 350% based on a post-money valuation of $35m. On a per-share basis, Lava Blue's intrinsic value is $1.012 versus the current share price of $0.225.

Further Upside Potential. It is important to note that this valuation estimate does not take into account the value of Lava Blue's mineral resources as well as the company's ability to monetise critical materials IP outside HPA. These two excluded sources of value provide a margin of safety to the company's valuation.

Comparable Company Analysis

Lava Blue's sole comparable peer is Alpha HPA Ltd (ASX:A4N). A4N is a publicly listed Australian company focused on producing HPA and related aluminium materials. Despite generating under $100k in annual revenue from their stage one 26tpa plant, A4N is valued at ~$900m. A4N plans to invest $553m to expand its HPA equivalent production capacity to ~6,850tpa over the next 2-3 years. Similar to Lava Blue, A4N has received considerable financial support from the Queensland and federal governments totalling $66.7m in grants.

We see strong parallels between Lava Blue and A4N, as both companies have developed proprietary processes for producing HPA and have garnered significant government support. The key difference lies in their business models: A4N focuses on primary HPA production, which demands substantial capital investment, whereas Lava Blue combines its primary production strategy with a higher-margin licensing model. Given A4N's nearly $1b valuation, we strongly believe Lava Blue, currently valued at $32.5m, is significantly undervalued on a relative basis.

KEY MANAGEMENT AND BOARD OVERVIEW

Sylvia Tulloch (Executive Chairperson and Head of Science since 2015)

Sylvia is a materials scientist, with experience in the establishment and management of high-technology businesses, with a focus on commercialisation, mineral processing technologies and the cleantech sector. As Chair of Griffin Accelerator Holdings and a member of the CBRIN Board, Sylvia is an active member of the Canberra innovation ecosystem. She is also the Non-Executive Chair of ASX-listed Zeotech Limited (ASX:ZEO). Sylvia has been on the Boards of several Cleantech industry associations and was also a member of the Future Manufacturing Industries Innovation Council and Chair of the ACT Renewable Energy Innovation Fund Business Advisory Board.

Sylvia holds a Bachelor of Science (BSc.) and a Masters in Materials Science (MSc.) from the University of New South Wales, Australia.

Michael McCann (Managing Director and Founder since 2015)

Michael has 30+ years of experience in the energy and resources sector. In 2009, Michael founded Mt Rosey Mining Company to acquire and develop the Lava Plains mineral province. He then founded Lava Blue in 2015, when he incorporated Lava Blue Ltd as the parent company of Mt Rosey Mining Company. Michael originally trained as a journalist and has worked as a scientific publications editor at the National Health and Medical Research Council and Australia Energy News. Following his work as a journalist, Michael worked for and started numerous energy consulting firms. Michael holds a Bachelor of Arts in Journalism from the University of Canberra.

Uwe Boettcher (Non-Executive Director since 2016)

Mr. Boettcher is the Principal of the law firm Boettcher Law. He started his career at the firm now known as King & Wood Mallesons. Uwe is a mediation, insolvency, and dispute resolution specialist with over 40 years of experience in commercial and corporate law. He has a special interest in investing, with a focus on early-stage commercialisation of technology companies. Uwe holds a Bachelor of Arts and Laws from the Australia National University.

James Palmer (Executive Director and Part-time CFO since 2019)

James has a number of non-executive directorships and provides contract CFO and Advisory services to fast-growing entrepreneurial companies. He was CFO to archTIS Limited (ASX: AR9) and before that CFO for Seeing Machines (LSE:SEE). James is also the Group CFO of MCi Carbon, an Australian clean technology company. Before joining Seeing Machines James ran his own business providing consulting CFO services and advice to start-ups. Prior to that, James spent 20+ years at major accounting firms.

James holds a BSc (Honours) in Management Sciences from Manchester University and is a Fellow of both the Institute of Chartered Accountants Australia and New Zealand, and the Institute of Chartered Accountants in England and Wales. He is a registered company auditor in Australia and a graduate of the Australian Institute of Company Directors.

Michael Ford (Executive Director and Head of Queensland Operations since 2020)

Micahel has over 35 years of experience in international commodities & trade, agriculture, waste management, and critical minerals. Throughout his career, he has traded various commodity exchanges around the world, including agriculture, oil and metals. Michael has held director and senior management positions in large Australian and international companies, including the Chicago Board of Trade.

INVESTMENT THESIS

Clear Business Strategy

Lava Blue's mission is to be a leading producer of high-purity, high-value materials required for the energy transition. Lava Blue's business strategy is focused on the development of unique methods for producing these critical materials, starting with HPA, a good example of a high-purity, high-value material experiencing high demand growth rates. A key element of this strategy involves developing intellectual property by harnessing the expertise of a dedicated research team at QUT to explore and create proprietary critical material production methods. This research initiative has been notably supported by non-dilutive grants, significantly reducing costs and mitigating risks associated with Lava Blue's investment in the project. Additionally, Lava Blue aims to monetise its IP through a licensing model, enabling the company to achieve relatively high-profit margins without substantial capital investment. By integrating these two strategic components, Lava Blue is positioned to earn high returns on capital on an IP portfolio that is constantly being enhanced. In addition to its licensing business model, Lava Blue plans to enter primary HPA production. This will allow the company to capitalise directly on the growing demand for HPA whilst reducing reliance on the licensing business.

Scalable Business Model

The absence of broad exclusivity clauses in Lava Blue's licensing agreements allows the company to acquire additional licensees without limitations. So far, Lava Blue has demonstrated its success in signing up licensees in Australia. With the projected surge in demand for critical minerals such as HPA, we expect the company to continue to sign new licensees, both in Australia and overseas. Additionally, Lava Blue's business model scalability is bolstered by its licensing model, where royalty revenue grows at no additional cost as licensees add production capacity and scale their production of critical materials, e.g. HPA.

For primary HPA production, Lava Blue intends to employ a modular approach in the design and build of its HPA plant, ensuring easy scalability of production capacity. Lava Blue's unique HPA production method enables the use of both off-the-shelf equipment and custom-built machinery fabricated at PRiSM. This approach is anticipated to streamline equipment procurement, making it faster, more cost-effective, and scalable to build production capacity.

High Barriers to Entry

Lava Blue has invested significantly in its unique intellectual property portfolio of patents and is continuing to add depth and value to its IP through the addition of process controls, integration of machine learning and AI and development of in-house expertise. We believe this safeguards Lava Blue's unique value proposition from potential competitors who might try to develop innovative methods of producing critical materials. By securing its IP portfolio, Lava Blue has established a barrier of entry, making it difficult for competitors to replicate its critical mineral production techniques without investing significant amounts of time and money. In addition to its patent portfolio, Lava Blue also has trade secrets around the methods of production and formulations to produce critical materials. This adds an additional layer of protection for the company.

Successful Management

Lava Blue has a strong management team and board with extensive experience in the materials science, energy, and mineral resource industries. As the Managing Director of the company, Michael McCan has applied his extensive background in energy consulting and multi-disciplinary research project management for both government and private organisations to effectively secure non-dilutive grant funding, which has been instrumental

in advancing Lava Blue's IP portfolio. His extensive experience also enabled him to formulate Lava Blue's lucrative low-capex licensing business model focused on the high-demand critical materials industry. With Michael McCan at the helm, we are confident that Lava Blue will persist in realising its strategic goals and achieving further success.

Sylvia Tulloch, the company's Executive Chairperson and Head of Science, oversees the scientific operations in an executive capacity. With decades of experience as a materials scientist, Sylvia has been invaluable in leading Lava Blue's science initiatives to maximise the throughput of the company's research programs. Sylvia's ongoing involvement with the company is expected to strengthen the company's IP portfolio continually, which will increase monetisation opportunities and the blue-sky potential of breakthrough functional materials.

Michael McCann and Sylvia Tulloch have been supported by a team of experienced part-time executive directors who have supported the company in various functions such as legal, finance, and commercialisation.

Significant Investment Upside

Lava Blue has the potential to earn gross revenue of ~$100m within the next 10 years. Given the high operating leverage implicit within the company's licensing and primary production business model, a significant portion of net revenue earned (33%) is expected to drop straight to Lava Blue's bottom line. Underpinned by these strong fundamentals, we currently value the company at ~$146m, which is 4.2x its current post-money valuation of $35m. We believe Lava Blue's valuation could significantly increase if the company exceeds expectations in securing new licensing agreements and expands its primary HPA production capacity beyond 1,600 tpa.

Furthermore, our intrinsic valuation does not take into account the value of Lava Blue's non-HPA IP and mineral resource portfolio. These assets represent an added layer of value on top of an already attractive investment opportunity.

RISKS

Licencees' Failure to Achieve Desired HPA Production

The major risk facing the investment thesis on Lava Blue is the inability of its licensees to achieve their HPA production targets. This risk could materialise due to several factors, including insufficient funding for HPA plant construction, delays in plant establishment, or suboptimal plant production levels. Given that Lava Blue's valuation is closely tied to licensee HPA production, any such shortfall could significantly diminish the company's valuation.

Failure to Sign Licensing Agreements

If Lava Blue fails to sign new licensing agreements, the value of its IP portfolio might not be fully realised. Lava Blue might fail to acquire new licensees for various reasons, including competition from alternative licensed production methods and companies internally developing IP for critical materials production. However, it is worth noting that Lava Blue's base case valuation assumes that the company attains only 80% of its targeted FY34 licensee production. This assumption, to a certain extent, provides downside protection to Lava Blue's valuation against the risk of limited new licensee acquisition.

Inability to Fund Primary HPA Production Strategy

Lava Blue intends to build 1,600tpa of primary HPA production capacity, which will require a capital investment of ~$60m over 10 years. If the company is unable to secure this funding through project financing, government grants, or equity capital raising, its ability to become a commercial-scale HPA producer will be hampered. However, we

believe a staged approach of growing production capacity, i.e. 400 tpa every 2 years starting FY26-27, de-risks Lava Blue's ability to sufficiently fund its primary production strategy.

Inability to Secure Additional Research Related Grant Funding or Subsidies

Given Lava Blue's reliance on grant funding to fund research programs, failure to secure adequate grant funding might affect the company's cost structure and cash burn rate. In the worst-case scenario, should Lava Blue fail to raise adequate equity capital to fund research, the company may need to cut back on the degree of funding support it provides to its QUT research team, which is critical for maintaining a competitive edge.

References

[i] https://www.mordorintelligence.com/industry-reports/high-purity-alumina-hpa-market

[ii] https://www.industry.gov.au/mining-oil-and-gas/minerals/critical-minerals

[iii] https://www.industry.gov.au/publications/national-battery-strategy

Upon successful completion of the current capital raise, Lava Blue has agreed to enter into an ongoing mandate with Canary Capital, under which Canary Capital will receive a mandate fee and options.

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