



# Alpha HPA

## S U B M I S S I O N



Thursday, 29 November 2022

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Dear Joint Standing Committee on Trade and Investment Growth,

It gives me great pleasure to provide a submission to the inquiry into Australia's transition to become a green energy superpower. Alpha HPA are an Australian based, and ASX listed business that has developed a new, advanced process for aluminium purification and the production of ultra-high purity aluminium products – with substantial green credentials.

Our world-first process represents a large reduction in the carbon-profile over incumbent processes, whilst producing the highest purity materials at competitive pricing. Having perfected the process through over 8,000 hours of operation at demonstration scale and established a global product marketing network with over 40 end users, Alpha HPA is now rapidly scaling up its production base in Gladstone, Queensland, Australia, with first production commencing this November 2022, and full-scale production due by 2025.

High purity aluminium materials, including high purity alumina and high purity aluminium salts, are the critical components in the global decarbonisation effort. Through the commercialisation of our process, we produce ultra-high purity aluminium oxides, nitrates and sulphates for the burgeoning LED lighting, synthetic sapphire, and lithium-ion battery markets – at market-leading purity levels and at a dramatically lower carbon profile. Alpha HPA delivers this through its proprietary Smart SX process, which is the world's-first adoption of the solvent extraction (SX) purification technique to aluminium.

Alpha HPA's technology is capable of driving our world towards a cleaner, greener future and we present ourselves as a success-story of the Australian Government's foresight and investment into critical minerals - ensuring a better future for everyone.

Please find enclosed our responses based on the topics outlined in the Terms of Reference (ToR). We welcome this consultation and thank the Government on providing an opportunity to discuss:

- where trade and investment activities are already having a positive impact;
- emerging and possible future trends;
- the role of key commonwealth agencies in identifying new trade and inward investment opportunities, and assisting Australian companies to access these opportunities, including through whole of government coordination of investment;
- areas of growth, and how can these be accelerated and assisted, including through the use of Commonwealth Special Investment Vehicles; and how Australia can capitalise on existing and future trade agreements and economic frameworks with countries or regions around the world.

We welcome the opportunity to discuss the items raised in this submission in further detail with the Australian Government, and in particular, the Joint Standing Committee on Trade and Investment Growth.

Best regards,

Rimas Kairaitis

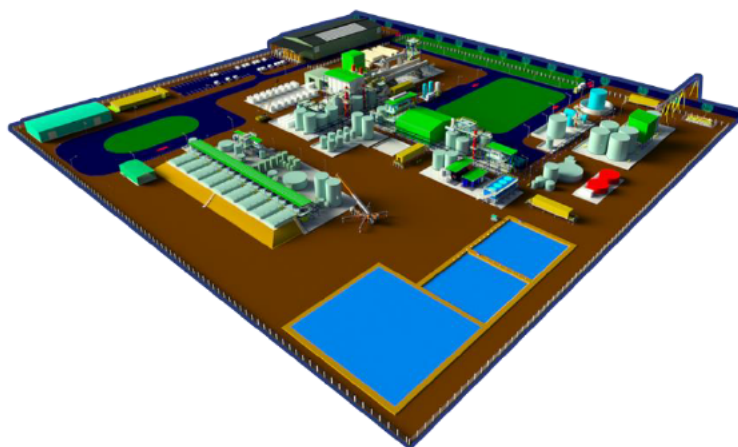
Managing Director

## 1.0 Trade and investment activities already having a positive impact

### 1.1 Grant: Modern Manufacturing Initiative Collaboration Stream (MMI-C)

In August 2022, Alpha HPA received notification from the Commonwealth Department of Industry, Science, Energy and Resources ('Department of Industry') that its application for grant funding under the Modern Manufacturing Initiative Collaboration Stream (MMI-C) had been approved.

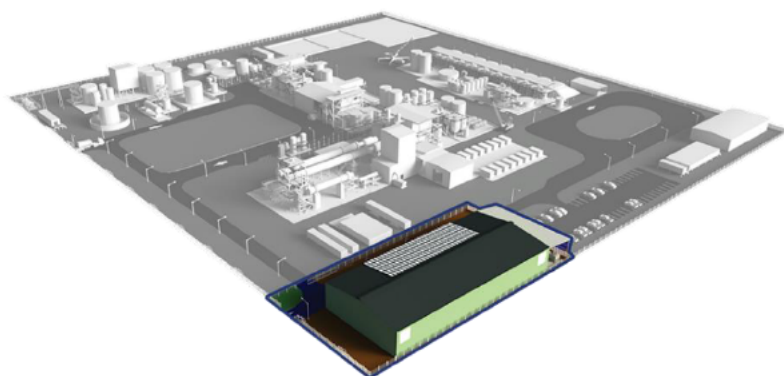
The \$45M grant was applied towards the capital expenditure of the full-scale HPA First Project (*pictured right*). The full-scale plant is scheduled to commence production by early 2025 and manufacture circa 10,000tpa high purity alumina / boehmites / precursors, including >5,000tpa Aluminium precursors.



### 1.2 Grant: Critical Minerals Accelerator Initiative ('CMAI')

More recently in September 2022, Alpha HPA received notification from the Commonwealth Department of Industry, Science, Energy and Resources ('Department of Industry') that its application for grant funding under the Critical Minerals Accelerator Initiative ('CMAI') had been approved for up to \$15.5M.

The CMAI grant activities are separate and distinct from those under the successful approval of \$45M under the Modern Manufacturing Initiative Collaboration Stream (MMI-C) as announced in March 2022, where grant monies will be directed towards the capital requirements of the HPA First Project's full-scale commercial facility.



The \$15.5M CMAI grant funds were applied toward immediately expanding and accelerating the production capability of the Precursor Production Facility (PPF), which is near completion in Gladstone as Stage 1 of the HPA First Project (*pictured left*). Specifically, this CMAI grant funding was directed towards:

- Further expanding PPF production capacity of high purity aluminium precursors
- Facilitating up to 10tpa of additional capacity of High Purity Alumina (HPA) production
- Facilitating up to 10tpa of additional capacity of High Purity Boehmite production
- Facilitating the addition of tableting capacity to produce HPA tablets for sapphire glass growth
- Installation of a large rooftop solar array and battery storage capacity



*“Alpha is delighted to receive further financial and commercial support for the HPA First Project from the Australian Federal Government. These additional funds allow Alpha HPA to accelerate its response to inbound demand for additional product volumes, in particular the production of HPA tablets to meet the immediate demand for sapphire glass production, and rapidly establish Alpha HPA in the supply chain at commercial volumes.”*

**– Alpha HPA Managing Director Rimas Kairaitis**



The allocation of the \$60M total funding speaks volumes of the innovative thinking and foresight from the federal government to accelerate the delivery of our world-leading technology – capable of driving the efforts towards a cleaner, greener world for everyone to benefit from. Ensuring our technology gets to market quickly, will mean a cleaner option for our supply chains will be on the market for them to adopt sooner.

The alumina industry plays an integral role in the Australian economy, but it is also one of Australia's 'hard-to-abate' industries. Alumina refining is one of Australia's most carbon-intensive industries, accounting for as much as 3% of emissions. The applied technology at our plant will see ~70% lower total CO2 emissions in comparison to the incumbent process as we:

- Do not use energy-intensive aluminium metal as our feedstock
- Recycle our reagents and sell them back to Orica meaning we're a near-zero waste facility (pictured right).
- Use 100% renewable energy to power our plant due to a MoU we have with CleanCo. The 100% renewable energy supply represents a 70% reduction in CO2 emissions vs the incumbent (alkoxide) HPA process.



### 1.3 Gladstone Regional Council's 10-Year Energy Roadmap

The Gladstone Region is facing a major economic transformation as industries grapple with the decarbonisation of the global economy. The challenges facing the region arise from the need to manage the shift away from fossil fuels and manage the impacts associated with new energy industries.

The Gladstone Region is particularly well positioned to take advantage of new economic opportunities as we shift to new energy solutions, but we also need to plan ahead to manage the potential impacts on the regional economy, community and the environment.

In early November, Alpha HPA attended Gladstone Regional Council's launch of the region's 10 Year Economic Transition Roadmap Report, prepared by The Next Economy. The actions laid out in the report will support and guide Queensland's industrial capital to becoming a renewable energy superpower and will see the region in prime position to respond to once-in-a-generation changes in the energy sector. The report covers:

- Energy security and affordability;
- Establishing a viable hydrogen industry;
- Diversifying the economy;
- Developing the local workforce;
- Capturing the community benefits; and
- Protecting land and water resources.

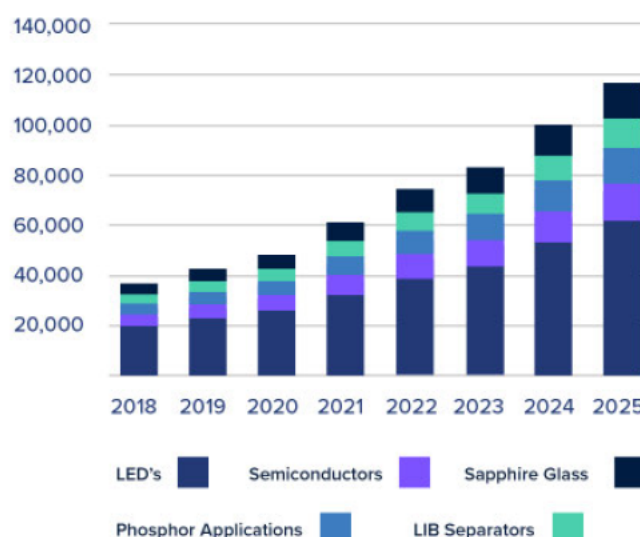
Alpha HPA is proud to be a part of the Gladstone region, with a key goal of ours to be part of the fabric of the community through positive engagement, interaction, and involvement. We seek to foster open and transparent dialogue with the community about our work and who we are so it's wonderful to see the reciprocation through these initiatives as we work to strengthen and diversify the regional economy and maximise the long-term benefits to the community.



## 2.0 Emerging and possible future trends

To support the transition to decarbonising technologies, the world needs high purity alumina (HPA). Our unique Smart SX Technology enables us to deliver the highest purity aluminium products in the world, at world-leading margins in a first-class jurisdiction and with a very low carbon footprint. The technology enables us to produce the world's most sustainable ultra-high purity aluminium products reflecting our commitment to decarbonisation and our vision to bring the whole world forward, together. We are green through ingenuity; we are Australia based and globally focussed.

Alpha HPA's products are in growing demand as the world's technologies and governments respond to a once in generational technology shift to meet the global challenges of decarbonisation.



### 2.1 Outlook for HPA

As global markets demand cleaner energy solutions, manufacturers of lithium-based energy storage solutions, LED lights and high-tech devices such as smartphones and smartwatches are demanding HPA. To 2025, the total HPA compound annual growth rate is forecast to be 17.5%. Looking at electric vehicles alone, growth demand for HPA as a key material is forecast to increase by 400%.

Currently, around 83% of the world's HPA supply comes from the Asia Pacific (APAC) region, with China the most prolific producer. Large, diversified chemical companies dominate this production, and generate HPA as a secondary product.

Growth demand is dominated by the APAC Region (~70% in 2016) primarily China, Japan and South Korea. Alpha HPA is ideally placed to service the most dominant region of global HPA demand.

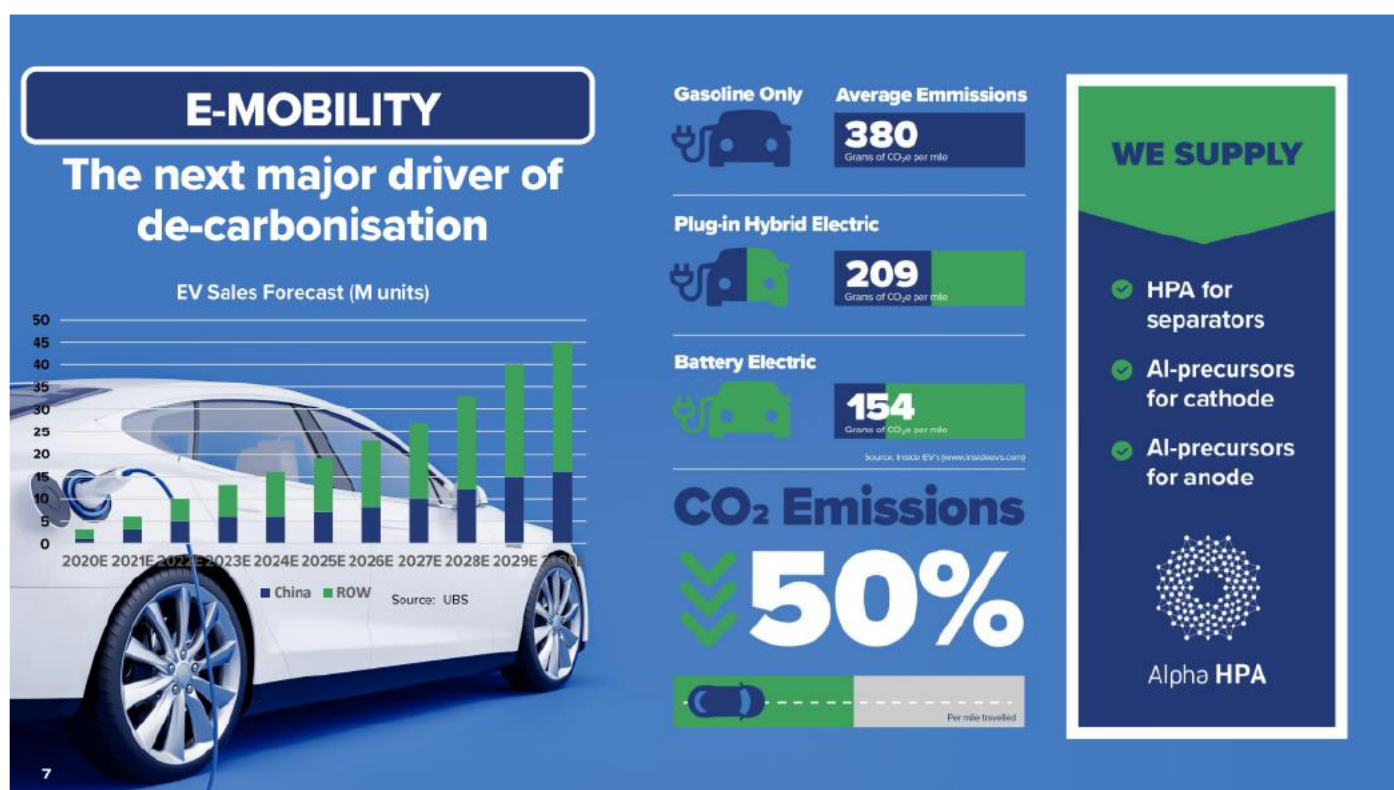


Our HPA First Project represents a large volume, single source, HPA production proposition, providing enormous opportunity. Alpha HPA has the potential to become the alternative supply source to the existing dominant producers. More importantly, Alpha HPA is well placed to fill the expected supply shortage as forecast HPA demand escalates over the next decade.

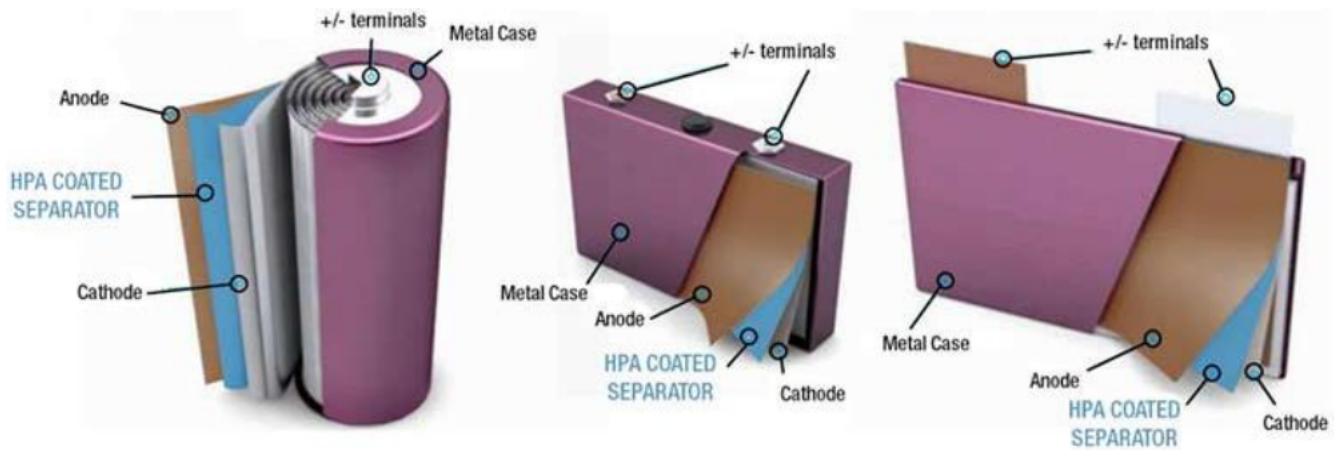
Our bespoke ultra-HPA products are inspiring innovation and driving significant performance improvements for application across a range of in-demand industries such as electronics, optics, lighting and lithium-ion battery sectors.

## 2.2 Demand for HPA in lithium-ion batteries

Our ultra-HPA products are leading to safer, more efficient, long-lasting, fast-charging lithium-ion batteries – helping to supercharge the sustainable e-mobility and energy storage revolution. HPA is a critical ingredient in lithium-ion batteries – improving their performance, stability, reliability, and safety.



Importantly, the purity of our aluminium oxides and precursors have proven advantages for lithium-ion battery applications, when compared to industry standard HPA. Our ultra-pure aluminium oxides improve the performance of cells in separator applications, while our ultra-pure aluminium nitrate provides a superior boehmite coating on both the anode and cathode particles, extending battery life, improving performance and safety of the overall battery.



### 2.3 Demand for HPA in synthetic sapphire

HPA is the critical, primary ingredient for synthetic sapphire, sought after for its extreme hardness, its ability to transmit in UV, visible and infrared wavelengths, and for its high-heat resistance and thermal conductivity. There is no substitute for HPA in the creation of synthetic sapphire – and purity is key.

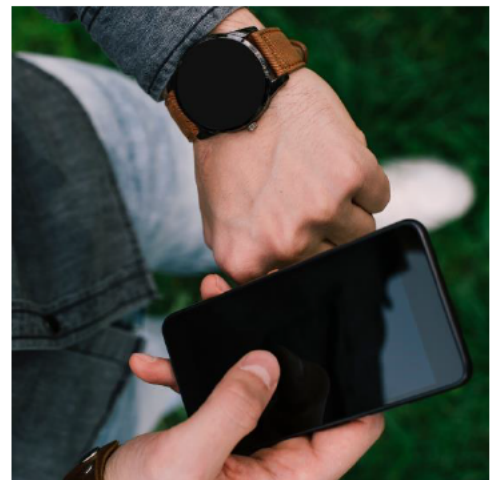
The synthetic sapphire born from our ultra-HPA products is high-value, high-margin, highly demanded and exceptionally pure – far superior to what's currently available on the market – creating unrivalled synthetic sapphire crystal for application in the most high-end optics and high-tech electronics devices – created with the world's most sustainable HPA.

Synthetic sapphire is used in LED lighting, semiconductor wafers used in the electronics industry, and scratch-resistant sapphire glass used for wristwatch faces, optical windows and smartphone components.

High-end photographic lenses and scratch resistant glass screen protectors are produced from synthetic sapphire.

Synthetic sapphire is used in the production of scratch-resistant optical lenses for photography, including modern smartphone cameras.

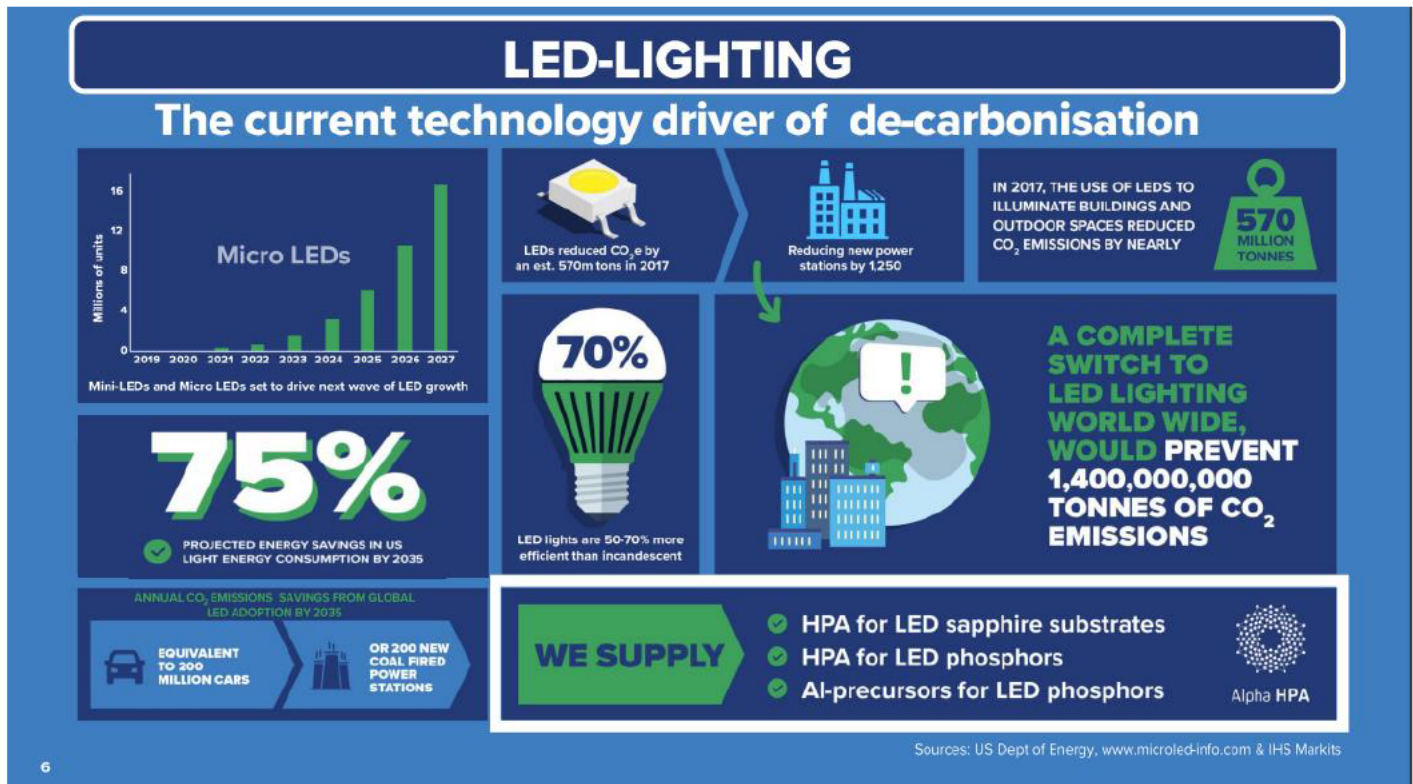
Luxury Swiss wristwatches and smartwatches are made using synthetic sapphire for the glass face due to its scratch-resistance.



### 2.4 Demand for HPA in LED lighting

Our world-leading range of ultra-HPA products are critical in the production of Light Emitting Diode (LED) lighting systems, assisting global LED manufacturers to create sustainable, high-efficiency micro and mini-LEDs. Synthetic sapphire wafer substrates made from HPA are an essential component of LED lighting and relied upon for its ultra-pure surface and exceptional thermal conductivity.

Our ultra-aluminium nitrate is used as ultra-pure precursors for the development of LED nanophosphors while our ultra-boehmite provides exceptional coatings for UV lighting applications. Our ultra-HPA and ultra-aluminium nitrate precursors are also key ingredients for the synthesis of LED aluminate phosphors, critical to the down conversion of light to the visible spectrum.



The applications for our ultra-HPA are growing ... watch this space!

### 3.0 The role of key commonwealth agencies in identifying new trade and inward investment opportunities, and assisting Australian companies to access these opportunities, including through whole of government coordination of investment

To facilitate the development of economic sectors in Australia to meet the global energy transition trend, policy formulation and government response need to reflect the full spectrum of challenges and barriers faced by miners, metal processors, chemical manufacturers, and integration specialists.

Commonwealth government departments such as the Department of Foreign Affairs and Trade (DFAT) have the potential to continue working on markets for our products. DFAT can help to secure offtake agreements with countries such as Japan, South Korea, Taiwan, Europe, and UK who are existing trade partners, are renewable poor and have strong decarbonisation targets. By doing this, we can secure Australia's place in key renewable supply chains (i.e.: critical minerals, lithium-ion batteries, aluminium etc.).

Locking in strong trade partnerships builds investment confidence and can be further supported by agencies such as EFA and CEFC. By working with industry on this, the challenges can then be addressed with a whole of government approach to support projects and new companies, like Alpha HPA to reach commercialisation in time to meet global demand.

*Our world-leading solvent extraction process has pinpoint like precision, enabling us to deliver our in demand ultra-high purity aluminium products to the world – sustainably.*

**– Alpha HPA Chief Operations Officer Rob Williamson**



Other opportunities for government to support Australian industry in a smooth transition to become a green energy superpower is through key infrastructure, skills training and guidance around social licence will ensure smooth project delivery. There is also a prospect for governments to leverage onshore opportunities such as value adding and the buildout of local manufacturing capabilities.



#### **4.0 Areas of growth, and how can these be accelerated and/or assisted, and how Australia can capitalise on existing and future trade agreements and economic frameworks with countries or regions around the world**

The world is moving towards a new era of sustainability to meet the challenges of climate change and Alpha HPA is absolutely committed to playing our part. We are focused on the road ahead, which is all about investing in technology to lower emissions; producing the materials needed for reliable renewable energy while increasing our uptake of renewables; and reducing our impact on the environment. We're not alone in our efforts. Australia's key trading partners including Japan, South Korea, Europe and the UK are focused on decarbonisation through emission reduction targets by harnessing their natural advantages to meet global demand and provide scale in terms of revenue and job creation opportunities. Together, we are creating the building blocks for a lower emissions economy.

But, the average make-up of the Australian electricity market over the past three months was:

- 64% from coal
- 14% from wind
- 9% from hydro
- 7% from solar
- 5% from gas

(Source – AEMO)

This underlines the opportunities to diversify Australia's energy mix, but also the immense size of the challenge. Australia needs large-scale investments in cleaner, greener products, reliable and affordable renewable energy sources and supply chain technology all while delivering the skills, training and infrastructure for the workforce of tomorrow.