PPK GROUP LIMITED (PPK)

INITIATION REPORT - BUY

GROUND-BREAKING SCIENTIFIC AND TECHNOLOGICAL ADVANCEMENTS PROGRESSING TO COMMERCIALISATION

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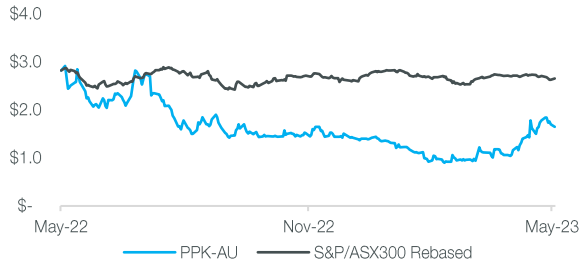
BUY	SHARE PRICE	TARGET PRICE	VOLATILITY
	$1.44	$2.35	HIGH

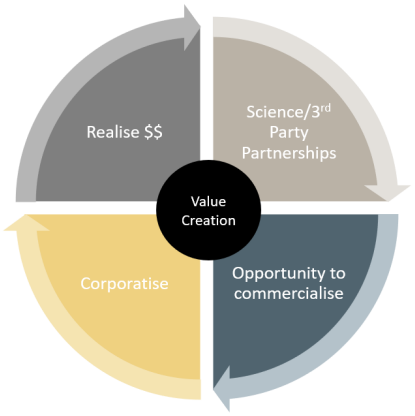
SHARE PRICE CHART



COMPANY DATA & RATIOS

Enterprise value	$78m
Diluted market cap	$129m
Diluted shares	89m
Insider ownership	30%
Website link	PPK Group
Current Cash Balance	$46m

PPK'S VALUE CREATION CYCLE



INVESTMENT	OWNERSHIP	STAGE
BNNTTL	51%	Realise $$
White Graphene	59.4%	Corporatise
Li-S Energy	47.7%	Realise $$
AMAG	32.5%	Realise $$
CIB	45%	Realise $$
PowerPlus	51%	Realise $$
Ballistic Glass	40%	Science/3rd party
3D Dental	45%	Science/3rd party
Strategic Alloys	45%	Opportunity to commercialise
BNNT Precious Metals	45%	Opportunity to commercialise

FUNDAMENTAL KNOWLEDGE

PPK Group (PPK) group invests in innovative technology and supports them on their pathway to commercialisation. PPK is commercialising ground-breaking scientific and technological advancements that can significantly improve multibillion dollar industries.

- **BNNT TECHNOLOGIES LIMITED (BNNTTL):** The only known company to produce high quality BNNT at scale and at a price suitable for commercial applications. BNNT is the world's strongest and most advanced fibre; much stronger than any metal or carbon fibre, extremely flexible, and able to withstand extreme temperatures, among many other amazing properties. Has applications across multiple global industries including space, defence and automotive.
- **WHITE GRAPHENE:** Has addressed key issues preventing consistent production of high quality White Graphene. White Graphene is the thinnest compound known to man at one atom thick, the lightest material known, the strongest compound discovered, and has many other great properties.
- **LI-S ENERGY (ASX:LIS):** LIS has addressed the key challenges that have prevented the commercialisation of lithium-sulfur batteries, which have many benefits over current li-ion batteries, having more than 5 times the theoretical energy density, being lighter and safer. LIS's cells are currently demonstrating a gravimetric energy density of over 400Wh/kg, and a volumetric energy density of 540Wh/l. Compared to current Li-ion cells this is nearly double the gravimetric energy. A typical li-ion battery cell that can be found in current tesla electric vehicles has a gravimetric energy density ~220Wh/kg.
- **ADVANCED MOBILITY ANALYTICS (AMAG):** Predicts potential road incidents using artificial intelligence that processes images/videos in real time with 99.97% accuracy.
- **CRAIG INTERNATIONAL BALLISTICS (CIB):** Australia's largest manufacturer of overt and covert body armour.
- **POWERPLUS ENERGY:** Australia's largest privately owned lithium battery manufacturer. PowerPlus supplies reliable, long-lasting modular battery storage solutions for on and off-grid homes and businesses. Through automation, strategic growth initiatives and other business process improvements, PPK will work towards growing the annual revenue of PowerPlus from over $25m to $100m within three years.

SCALING UP FOR COMMERCIALISATION

The group is currently scaling up production of BNNT & White Graphene to produce at commercial quantities and prices. We believe commercialisation and value creation from BNNT, White Graphene is likely sooner than the market realises.

PPK IS SIGNIFICANTLY BELOW FAIR VALUE

PPK is trading significantly below fair value. This is just the base case and does not include any upside if any of PPK's investments are successful. If PPK's investments are successful there could be material upside and a significant re-rating of the stock.

CONTENTS

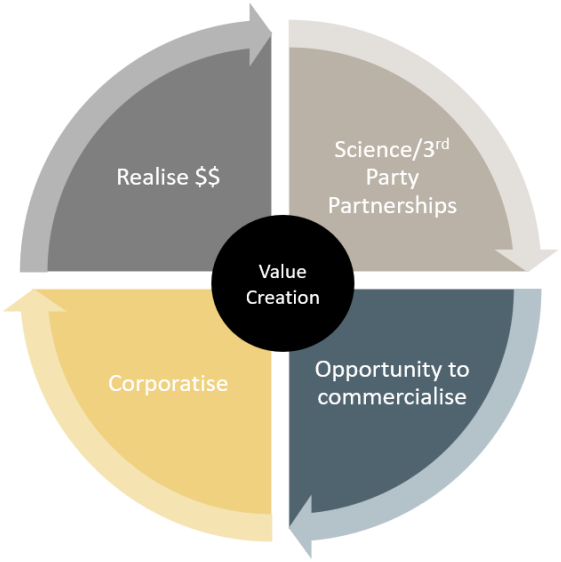
PPK GROUP LIMITED INVESTMENT OVERVIEW

1. PPK Group (PPK) allocates capital and expertise in high potential science and technology opportunities with a current focus on nano materials and energy solutions.
2. Exposure to the commercialisation of ground-breaking scientific and technological advancements that can significantly improve multibillion dollar industries:
   - **Boron Nitride Nanotubes (BNNT):** The world's strongest and most advanced fibre stronger than any metal or carbon fibre, extremely flexible, excellent thermal conductors, optically and infrared transparent, chemically stable, able to withstand extreme temperatures, has neutron shielding capability and are electrical insulators.
     Application use cases across multiple global industries including space, defence, automotive, and enhanced jewellery.
   - **White Graphene:** The thinnest compound known to man at one atom thick, the lightest material known, the strongest compound discovered, very high thermal conductivity, micro tensile strength, thermal and chemical stabilities, corrosion resistance, neutron & radiation absorption, nano energy harvesting.
   - **Lithium Sulfur (LIS) Batteries:** Has many benefits over current lithium-ion batteries including having more than 5 times the theoretical energy density, being lighter, safer, and using more environmentally friendly materials. Uses BNNT's as part of its battery solution.
   - **PowerPlus Energy:** Australia's largest privately owned lithium battery manufacturer. PowerPlus Energy specialises in supplying reliable, long-lasting modular battery storage solutions for on-grid and off-grid homes and businesses.
   - **Advanced Mobility Analytics:** Predicts potential road incidents using artificial intelligence that processes images/videos in real time with 99.97% accuracy vs the current standard of 70% accuracy.
   - **Craig International Ballistics:** Australia's largest manufacturer of overt and covert body armour and tactical ballistic shields for police forces and security companies, both domestically and internationally.
3. The only known company that has figured out a commercially viable solution to produce BNNT, White Graphene and Lithium Sulfur Batteries.
4. Has scaled up BNNT to produce at commercial quantities and prices and is scaling up White Graphene.
5. Commercialisation and value creation from BNNT, White Graphene and LIS likely sooner than the market realises.
6. Craig Ballistics and PowerPlus Energy are already commercial. The cash flow from these two businesses should support PPK's ongoing operations.
7. Two comparable companies to PowerPlus Energy, Redflow (ASX:RFX) and RedEarth Energy, are valued at ~$45m and $100m respectively. PowerPlus Energy does more revenue than both and is profitable. It has the potential to be worth a significant portion of PPK's market capitalisation.
8. Strong feeder network of universities that introduce emerging technological and scientific developments to the group, and access to capital to scale and realise value.
9. Additional R&D projects for further consideration that can add value over time:
   - Strategic Alloys: Creating a super strength aluminium and manganese alloy by introducing BNNT into its formulation. Multiple applications exist for super strength aluminium alloys and super strength titanium alloys with industries including aerospace, aviation and defence seeking materials that are lighter, stronger, more heat resistant and more durable.
   - BNNT Precious Metals: Infusion of BNNT as a nano-reinforcement into gold and silver to enable superior strength, hardness, and durability of these metals for both industrial and the jewellery market.
10. PPK is priced significantly below fair value.

COMPANY OVERVIEW

COMPANY INFORMATION & BUSINESS MODEL

PPK Group (PPK) is a technology incubation and commercialisation business. The group invests in innovative technology and supports them on their pathway to commercialisation.



Source: PPK Group

PPK's business model is centred around step change value creation. The business invests in and partners with emerging technology or scientific developments where there is an opportunity to commercialise patented technologies. PPK will then corporatize the organisations and support them towards commercialisation.

Research and development projects typically have long time horizons. PPK provides management services (back-office/administration operations, legal, accounting etc.) to oversee the projects, accesses funding to commercialise new technology products and maximise value creation.

PPK has 10 investments at various stages of the value creation cycle. 5 out of 10 projects are in the realisation stage and are commercial or on the path towards commercialisation.

PPK's investments are targeting various multi-billion market opportunities.

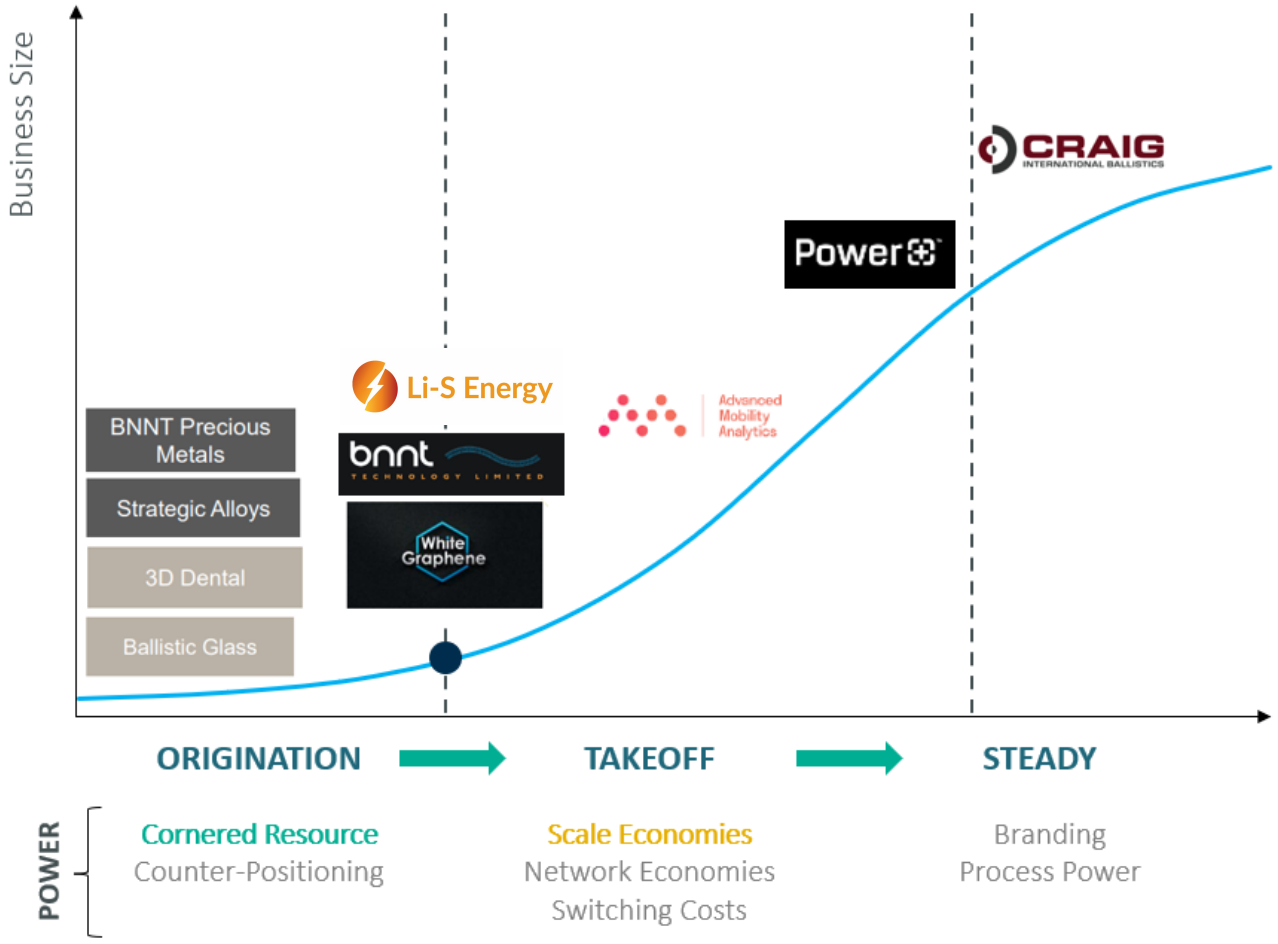
Science/3rd Party	Opportunity to commercialise	Corporatise	Realise $$
Ballistic Glass	Strategic Alloys	White Graphene	bnnt TECHNOLOGY LIMITED
3D Dental	BNNT Precious Metals		Li-S Energy
			CRAIG INTERNATIONAL BALLISTICS
			Advanced Mobility Analytics
			Power

Source: PPK Group

THE PPK ADVANTAGE

PPK has a very strong feeder network of universities and early stage corporations that introduce emerging technological and scientific developments to the group. A key partnership is Deakin University which PPK has several joint ventures with. The important thing about this network is that it provides new ground-breaking intellectual property that PPK can assist to scale and commercialise.

If you consider business strategy and the path to success, PPK have access to a cornered resource (preferential access to game changing intellectual property through its university network) and have the ability to scale businesses with access to capital.



Source: Hamilton Helmer, BOEQ

We believe that all of PPK's investments have intellectual property that is a proprietary resource, and the majority are on the verge of significantly scaling up. We believe this provides a long-term competitive advantage to the group.

PPK'S INVESTMENTS

OVERVIEW OF PPK INVESTMENTS

PPK's investments all contain very exiting technological breakthroughs that could significantly improve the way many industries operate and meaningfully enhance the products they produce. Below is an overview of PPK's investments highlighting the key technological breakthroughs and some of their applications. For more detail refer to section PPK's investments in detail in the appendix.

BNNT TECHNOLOGY LIMITED – OWNERSHIP 51.0%

- Develop, manufacture and commercialise BNNT's.
- Significant material benefits in aviation, automotive, space travel, power generation, batteries, electronics and defence.
- The only known company to produce high quality BNNT at scale and at a price suitable for commercial applications.
- Website link

LI-S ENERGY (ASX:LIS) – OWNERSHIP 47.7%

- Developing lithium-Sulfur battery technology.
- Significant leaps in performance and capabilities of electric vehicles, drones, consumer electronics, spacecraft and more.
- Has more energy, is lighter and safer vs current batteries.
- Solves key challenges that prevented previous commercial adoption.
- Website link

WHITE GRAPHENE LIMITED – OWNERSHIP 59.4%

- Aiming to manufacture White Graphene at scale
- Thinnest, lightest and strongest compound known to man.
- High thermal conductivity, corrosion resistance, neutron & radiation absorption
- Valuable addition to medical, composite materials, electronics, energy systems, apparel & safety, water filtration systems and coatings.
- Website link

CRAIG INTERNATIONAL BALLISTICS – OWNERSHIP 45.0%

- Leading supplier of body armour to the Australian Defence Force and Police Forces
- Defence, police force and security applications
- Website link

POWERPLUS ENERGY – OWNERSHIP 51.0% (WITH A PATHWAY TO 75% OWNERSHIP)

- Australia's largest privately owned lithium battery manufacturer
- Supplies reliable, long lasting modular battery storage solutions for on-grid and off-grid homes and businesses.
- Website link

ADVANCED MOBILITY ANALYTICS GROUP – OWNERSHIP 32.5%

- Enable city deployments and governments to proactively manage road safety and reduce crash risk for all road users.
- Predicts potential road incidents using AI that processes images/videos in real time with 99.97% accuracy vs the current standard of 70% accuracy.
- Released the world's first SaaS using AI, video analytics, deep learning and econometric technologies to manage road safety.
- Website link

Ballistic Glass

BALLISTIC GLASS – OWNERSHIP 40.0%

- Infuse BNNT into bullet resistant glass
- Automotive, architectural, marine, military and security purposes
- Improved resistance at a lower weight will reduce costs

BNNT Precious Metals

PRECIOUS METALS – OWNERSHIP 45.0%

- Test the infusion of BNNT into gold and silver.
- Used in electronics, aviation and space to reduce weight and costs.
- New opportunities for jewellery and automated jewellery manufacturing.
- Superior strength, hardness and durability.

Strategic Alloys

STRATEGIC ALLOYS – OWNERSHIP 45.0%

- Creating a super strength aluminium and manganese alloy by introducing BNNT into its formulation.
- Aerospace, aviation and defence applications.
- Lighter, stronger, more heat resistant and more durable.

3D Dental

3D DENTAL – OWNERSHIP 45.0%

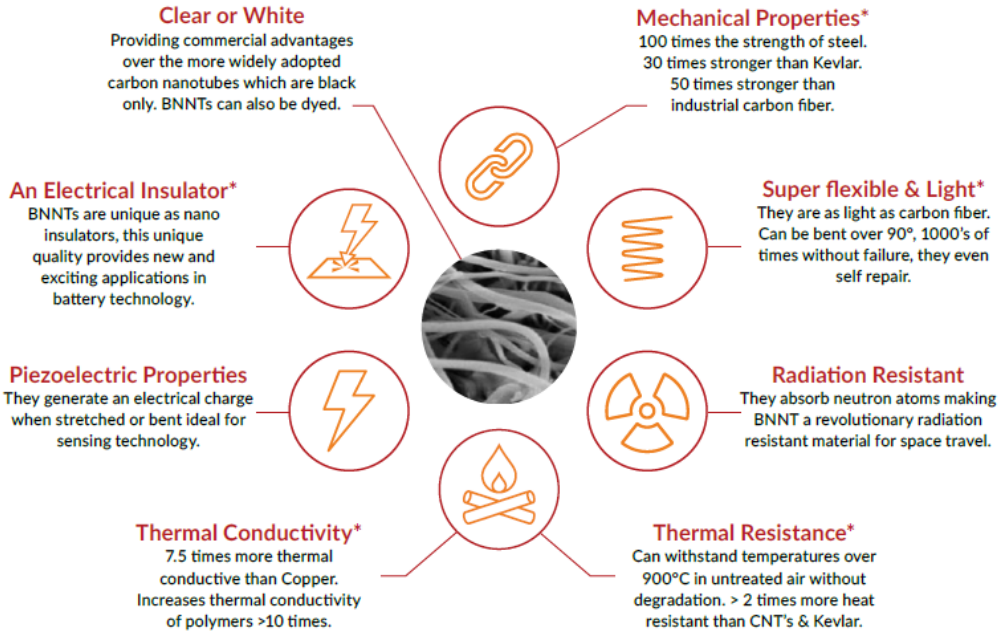
- Infuse BNNT into frequently used dental materials
- Dental applications
- Lower failure risk of most forms of dental implants

BORON NITRIDE NANOTUBES

PPK's major focus is on its investments that relate to the application of Boron Nitride Nanotubes (BNNT). Of PPK's 10 investments, 6 utilise BNNT as an input to the research and development of breakthrough technological advancements. Since the majority rely on BNNT Technology Limited's (BNNTTL) successfully production of BNNT at scale to be commercially viable, we explore this project and BNNT in further detail.

A Boron Nitride Nanotube (BNNT) is an advanced nano material comprised of boron and nitrogen which has several unique properties, including high-strength, light weight, flexibility, thermal conductivity and thermal resistance, and the ability to act as a nano-insulator.

THE UNIQUE PROPERTIES OF BNNT



Source: Li-S Energy

BNNT's are stronger than any metal or carbon fibre, extremely flexible, excellent thermal conductors, optically and infrared transparent, chemically stable, able to withstand extreme temperatures, have neutron shielding capability and are electrical insulators. BNNT's are considered the world's strongest and most advanced fibre and offer significant material benefits in aviation, automotive, space travel, power generation, batteries, electronics and defence.

While BNNT's have been known about for many years it is very difficult and time consuming to manufacture high purity BNNT at scale and consequently very expensive – as much as US$900,000/kg or US$900/g. The reason it normally costs so much to make, and takes so long, is that the current method requires a temperature of 5000 degrees. It takes a long time and a lot of energy (high cost) to produce that sort of heat, and then the furnace used to produce it has to be cooled down again so the BNNT can be extracted. As a direct result the use of BNNTs in commercial applications has been very limited.

We believe that three major projects related to BNNT's are worth calling out individually: BNNT Technology Limited, Li-S Energy and White Graphene Limited. These appear to be PPK's most significant opportunities, from the major leap in technological advancement and the potential market size, and therefore the groups and investors major focus.

BNNT TECHNOLOGY LIMITED

BNNT Technology Limited (BNNTTL) is a joint venture between PPK (owns 51%) and Deakin University (owns 29%). BNNTTL has made several exciting breakthroughs that makes it the largest producer of BNNT in the world with a published sales price significantly lower than that of any competitor.

BNNTTL's patented manufacturing process is the world's leading technique for the scalable production of BNNTs. Developed over 15 years of research at Deakin's Institute for Frontier Material's (IFM), the manufacturing technology was licensed to BNNTTL in 2018. The technology utilises custom built equipment specifically designed to operate within extremely stringent parameters.

This process to create BNNT is extremely advanced, requires very specific inputs and processes to be followed and is difficult to replicate. BNNTTL's IP includes the patented technology, equipment design and detailed scientific knowledge.

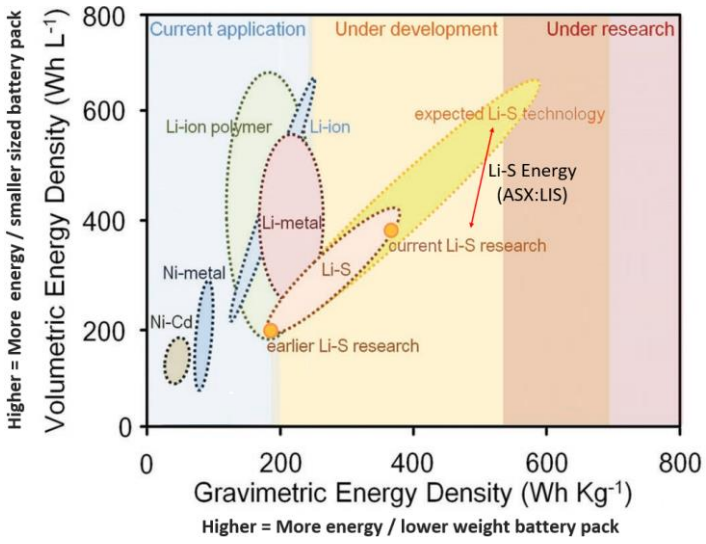
BNNTTL is well on track to be the leading and first to market producer of high-quality advanced BNNT in quantities and at a price suitable for commercial use. The company is leasing a 1,000m^2 facility at Deakin's Waurn Pond campus in Geelong providing capacity to expand. BNNTTL's has a production line capable of producing around 500 kilograms per annum with > 95% purity. BNNTTL will be well placed to meet future BNNT demand from its affiliates and open market customers.

LI-S ENERGY (ASX:LIS)

Li-S Energy (ASX:LIS) is an ASX listed battery technology developer focused on the commercialisation of lithium-Sulfur and other types of metal based batteries.

- **NEXT GENERATIONAL BATTERY TECHNOLOGY:** The lithium-Sulfur battery composition has been widely researched over the last two decades as having many benefits over current lithium-ion batteries including having more than 5 times the theoretical energy density, being lighter, safer and using more environmentally friendly materials.
- **FIRST TO ADDRESS KEY HISTORICAL LITHIUM-SULFUR BATTERY CHALLENGES:** Li-S Energy's BNNT and Li-Nanomesh's battery solutions address a number of the key historical challenges that have prevented the commercialisation of lithium-Sulfur batteries. LIS's solution successfully addresses the polysulphide shuttle effect, lithium dendrite formation, cathode expansion and failure, and excessive heat during charging, all of which have caused lithium Sulfur batteries to fail in the past.
- **EXCLUSIVE BNNT AGREEMENT:** One of the key breakthrough's in LIS's battery technology is the use of Boron Nitride Nanotubes (BNNTs). Historically, this incredible advanced material was prohibitively expensive to make and use in commercial applications at scale. LIS has exclusive access to low-cost, high-purity BNNTs for use in all metal batteries from its largest shareholder PPK Ltd.
- **STRONG MOBILE BATTERY DEMAND EXPECTED:** There is a strong consensus view that battery demand is expected to accelerate materially over the next decade, largely driven by the growing demand for electric vehicles, drones, general aviation, and consumer electronics. The electric vehicle battery market is expected to expand from USD$35bn to USD$165bn by 2030[1]. Li-S Energy's battery is lightweight, fast charging and has high energy density making it an excellent solution to address the demand for mobile batteries.
- **THE BEST BATTERY IN THE WORLD:** There are a number of battery developers that are competing to be the next generation battery of choice. Li-S Energy's battery composition has a higher gravimetric energy density (the measure of how much energy a battery contains in proportion to its weight) than its competitors.

COMPARISON OF BATTERY TECHNOLOGY



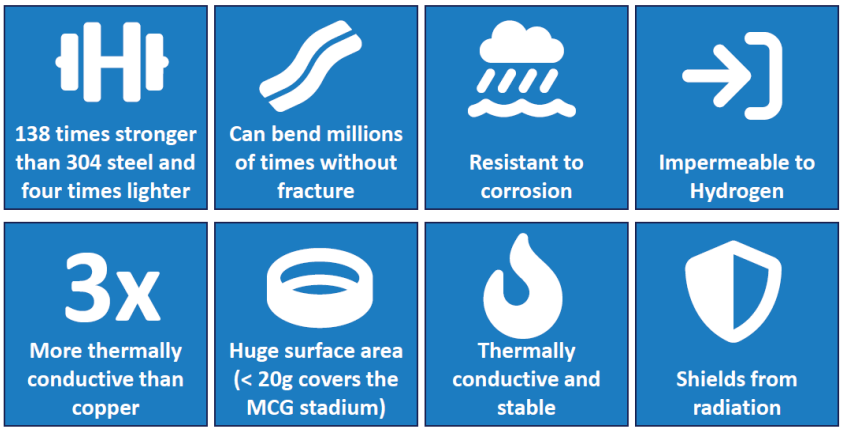
Source: Advanced Materials Current Status and Future Prospects of Metal-Sulfur Batteries

- **STRONG BUSINESS MODEL:** Li-S Energy plans to licence its battery technology and intellectual property to battery manufacturers. We believe that this is the optimal business model for the battery development industry as it is much less capital intensive and allows for a faster entry to market than the alternative of building a giga-factory itself. Li-S Energy's business model provides the company with an advantage over some of its competitors without even considering its battery technology due to the lower long term capital requirements.
- **MULTIPLE PATHS TO COMMERCIALISATION:** Li-S Energy has a multi-pronged business strategy to fast-track the company's commercialisation through its battery and Li-Nanomesh intellectual property. LIS has multiple collaboration agreements underway with product manufacturers. See our LIS report from earlier this year.
  Li-Nanomesh has the potential to prevent dendrite growth in any battery with a metal anode, providing LIS with a diversified revenue stream and the potential to generate revenue before its Li-S battery has been fully commercialised.
- **FULLY FUNDED FOR THE NEXT TWO YEARS:** LIS is well funded to execute its business strategy.

WHITE GRAPHENE LIMITED

White Graphene Limited (WGL) is aiming to manufacture White Graphene on a commercial scale and expects its unique manufacturing process to produce low-cost high quality White Graphene to market end users. White graphene is a nanomaterial termed boron nitride nanosheet (BNNS) and referred to as white graphene due to its unique quality to be almost transparent. BNNS shares its structure with graphene (the Nobel Prize winning material), but it is white in appearance (graphene is black).

- **INCREDIBLE PROPERTIES:** Graphene is the thinnest compound known to man at one atom thick, the lightest material known, the strongest compound discovered, the best conductor of heat at room temperature and the best conductor of electricity known. Unlike traditional black graphene, white graphene can be coloured into the entire colour spectrum.



Source: White Graphene Limited

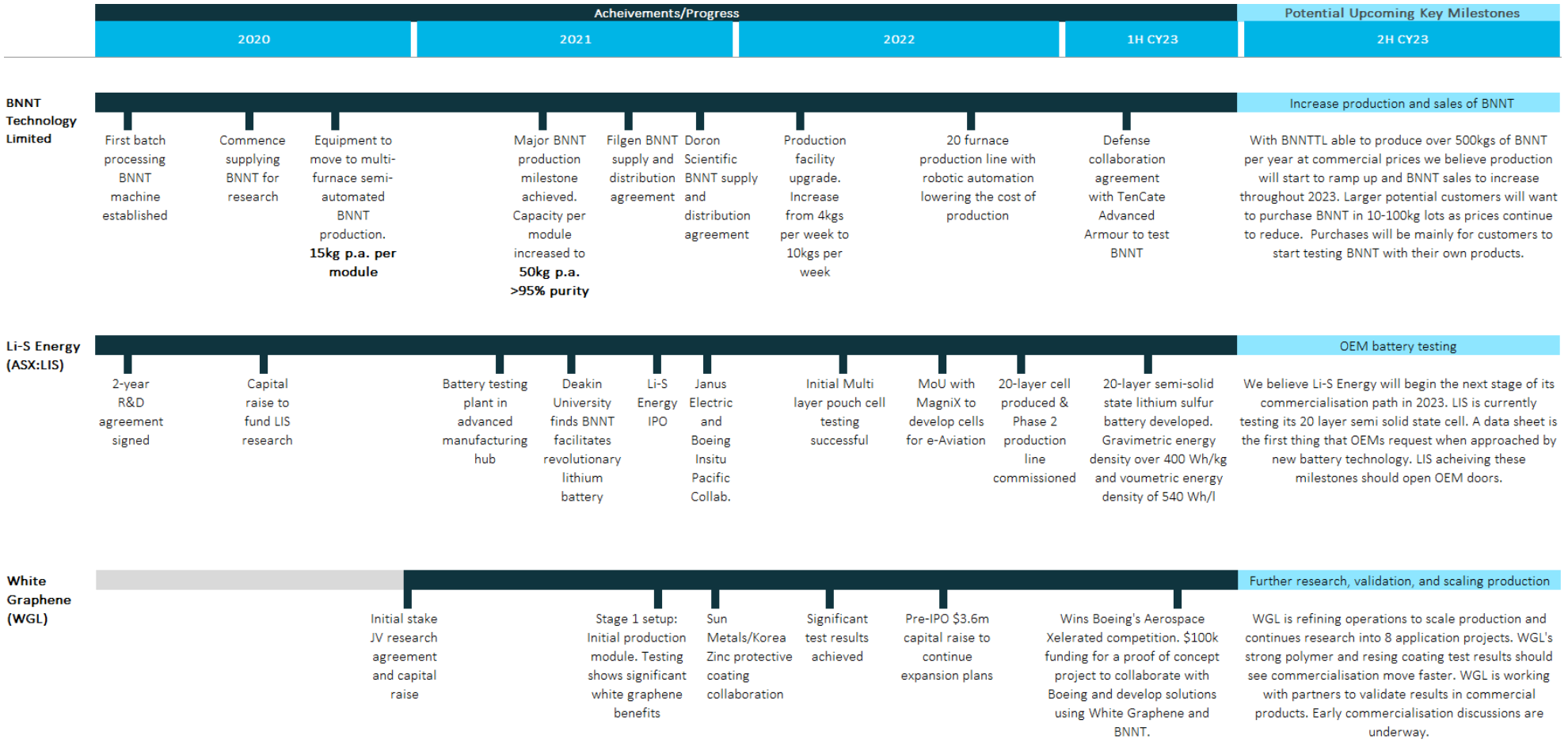
White Graphene possesses very high thermal conductivity, micro tensile strength, thermal and chemical stabilities, corrosion resistance, neutron & radiation absorption, nano energy harvesting.

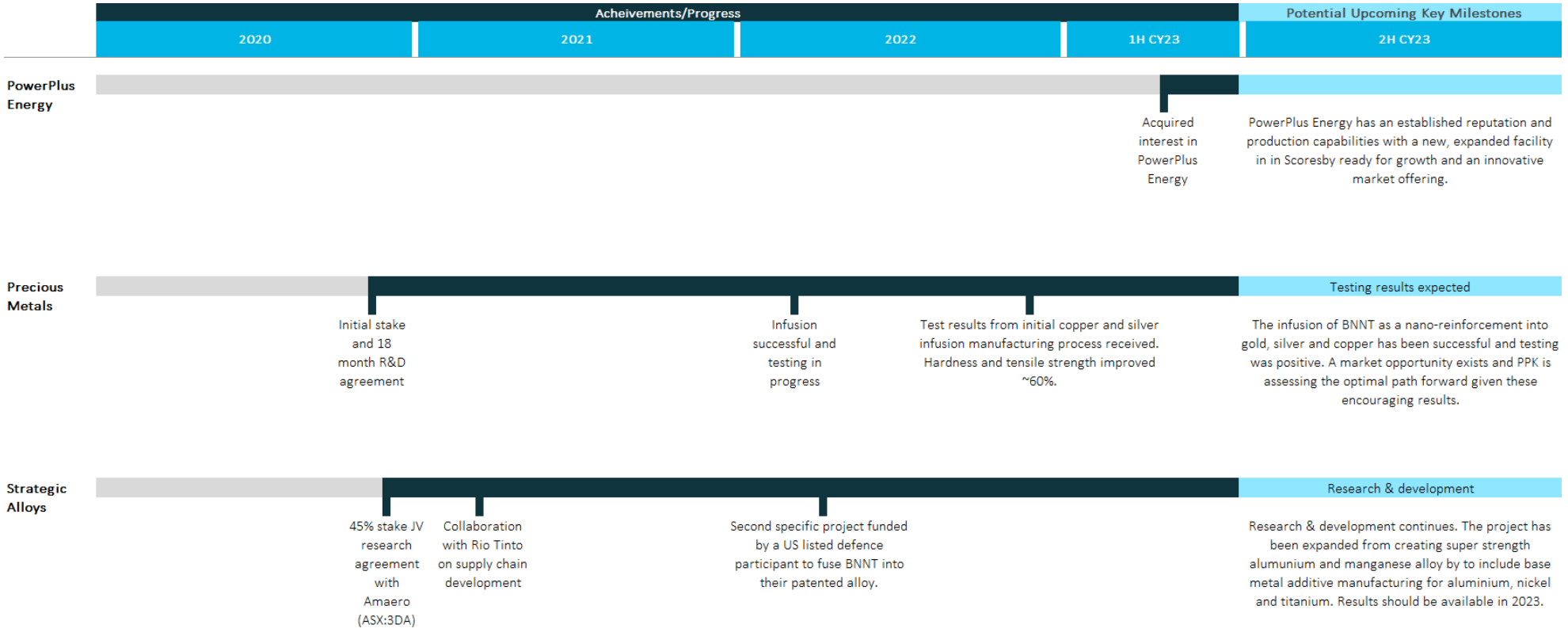
- **CAN SIGNIFICANTLY ENHANCE A BROAD RANGE OF MATERIALS AND ELECTRONICS:**
  - Coatings: Improves hardness, corrosion, wear and moisture resistance. Anti-microbial and anti-bacterial properties e.g. boats, swimming pools, under car protection etc.
  - Hydrogen: Impermeable to hydrogen enable it to improve linings of pipes and pressure vessels
  - Batteries and super capacitors: Nano-insulator and thermal conductor
  - Cosmetics: Smooth, uniform application of creams and powders
  - Electronics: Efficient conductor of heat and electrical insulator
- **WGL IS THE FIRST TO ADDRESS PRODUCTION ISSUES:** It is difficult to produce consistent high quality White Graphene. WGL's method of manufacturing White Graphene is the result of a

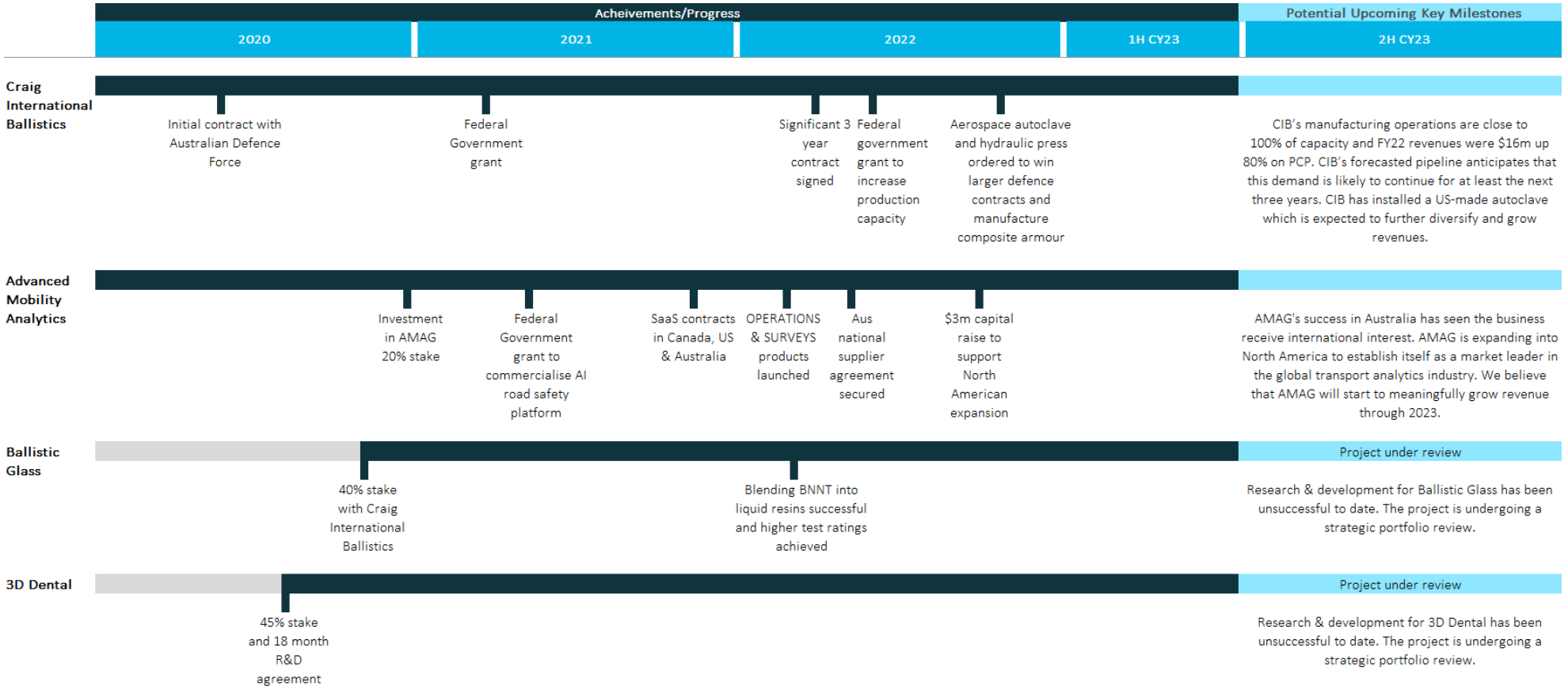
decade of research and development at Deakin University and has addressed key issues to producing consistent high quality consistent White Graphene.

- **THE WORLD'S LEADING AND LOWEST COST PRODUCER OF WHITE GRAPHENE:** Over two years, WGL has been able to scale production from grams a day to around a kilogram per week in its Geelong facility and has plans to scale. WGL's pilot production plant is now producing close to 500g of White Graphene per day and plans to scale to 2kg per day in approximately six months once key machinery components are delivered following its September 2022 capital raising. WGL has further plans to scale its plant to produce more than a tonne per week.
- **OUTSTANDING RESULTS FOR COATINGS:** Standardised testing demonstrated significant improvements across a wide range of coatings and gelcoats. Coatings include timber, water based acrylic and epoxy flooring coatings used for construction purposes. Gelcoats are the outer corrosion-resistant surfaces used to protect boat hulls, wind turbine blades and any fiberglass structures, such as swimming pools and under vehicle protection.
- **NEAR TERM COMMERCIALISATION:** Off the back of strong coating test results, WGL is engaging with large OEMs and should soon commercialise its White Graphene product via licenced production deals.

TIMELINE & UPCOMING PRIORITIES




Acheivements/Progress
Potential Upcoming Key Milestones
2020
2021
2022
1H CY23
2H CY23
PowerPlus Energy
Acquired interest in PowerPlus Energy
PowerPlus Energy has an established reputation and production capabilities with a new, expanded facility in in Scoresby ready for growth and an innovative market offering.
Precious Metals
Testing results expected
Initial stake and 18 month R&D agreement
Infusion successful and testing in progress
Test results from initial copper and silver infusion manufacturing process received. Hardness and tensile strength improved ~60%.
The infusion of BNNT as a nano-reinforcement into gold, silver and copper has been successful and testing was positive. A market opportunity exists and PPK is assessing the optimal path forward given these encouraging results.
Strategic Alloys
Research & development
45% stake JV research agreement with Amaero (ASX:3DA)
Collaboration with Rio Tinto on supply chain development
Second specific project funded by a US listed defence participant to fuse BNNT into their patented alloy.
Research & development continues. The project has been expanded from creating super strength alumunium and manganese alloy by to include base metal additive manufacturing for aluminium, nickel and titanium. Results should be available in 2023.


Acheivements/Progress
Potential Upcoming Key Milestones
2020
2021
2022
1H CY23
2H CY23
Craig International Ballistics
Initial contract with Australian Defence Force
Federal Government grant
Significant 3 year contract signed
Federal government grant to increase production capacity
Aerospace autoclave and hydraulic press ordered to win larger defence contracts and manufacture composite armour
CIB's manufacturing operations are close to 100% of capacity and FY22 revenues were $16m up 80% on PCP. CIB's forecasted pipeline anticipates that this demand is likely to continue for at least the next three years. CIB has installed a US-made autoclave which is expected to further diversify and grow revenues.
Advanced Mobility Analytics
Investment in AMAG 20% stake
Federal Government grant to commercialise AI road safety platform
SaaS contracts in Canada, US & Australia
OPERATIONS & SURVEYS products launched
Aus national supplier agreement secured
$3m capital raise to support North American expansion
AMAG's success in Australia has seen the business receive international interest. AMAG is expanding into North America to establish itself as a market leader in the global transport analytics industry. We believe that AMAG will start to meaningfully grow revenue through 2023.
Ballistic Glass
40% stake with Craig International Ballistics
Blending BNNT into liquid resins successful and higher test ratings achieved
Project under review
Research & development for Ballistic Glass has been unsuccessful to date. The project is undergoing a strategic portfolio review.
3D Dental
45% stake and 18 month R&D agreement
Project under review
Research & development for 3D Dental has been unsuccessful to date. The project is undergoing a strategic portfolio review.

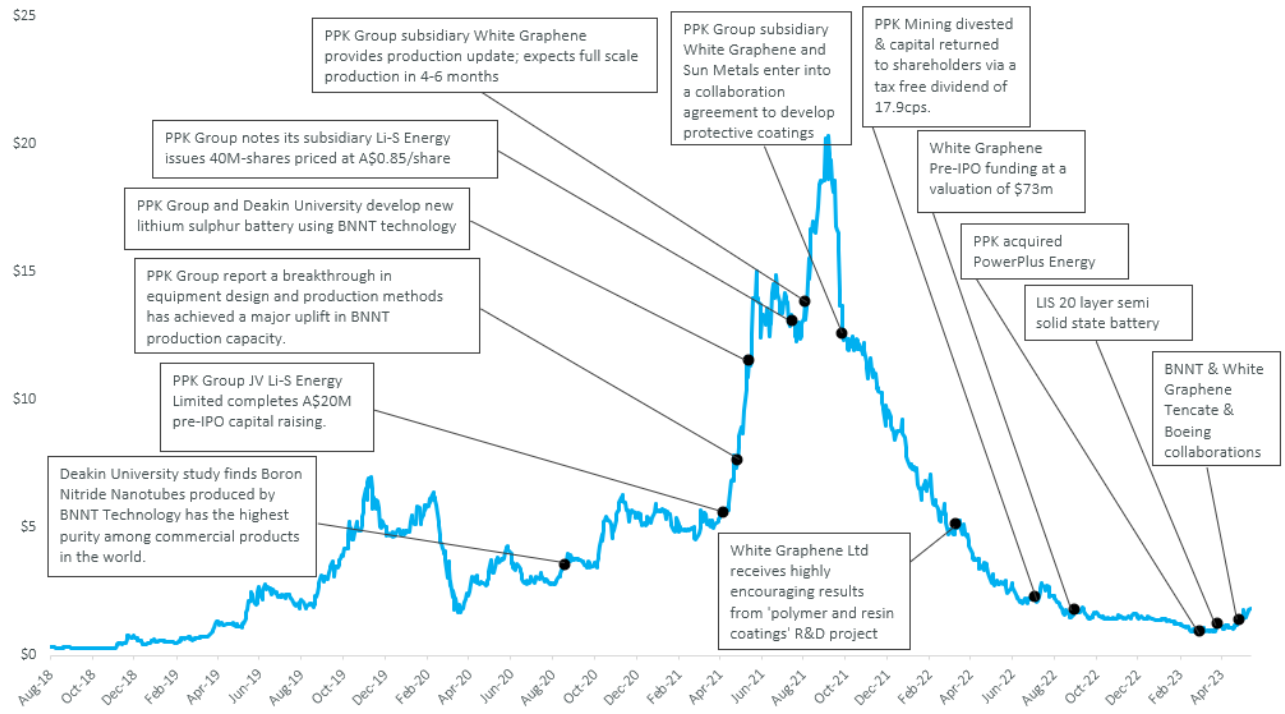
WHAT WE THINK

Through owning PPK Group investors get exposure to a multitude of breakthrough technologies that can significantly transform many multi billion and multi million dollar industries. Whilst the majority of projects are not yet commercial, progress towards commercialisation has been very promising. With a number of projects progressing it is more likely than not that at least one of them will succeed and generate significant value for PPK shareholders.

> *More Than You Know, Finding Financial Wisdom in Unconventional Places by Howard Marks:*
>
> *"Consider that roughly 90 percent of option positions lose money. Does that mean that owning options is a bad idea? The answer lies in how much money you make on the 10 percent of options positions that are profitable. If you buy ten options each for $1, and 9 of them expire worthless but the tenth rises to $25, you'd have an awful frequency of success but a tidy profit."*

Ultimately the market is looking for commercialisation and value creation and that has been evident in the way the share price has reacted to PPK's significant developments.

PPK SHARE PRICE CHART AND ANNOUNCEMENTS



Source: PPK Group, BOEQ

Now that the market cycle has turned the market appears to be ignoring the positive developments that PPK has made in the past year, or it believes that significant commercialisation is too far out in the future.

The market has provided an opportunity to buy PPK at a very good price. We believe commercialisation and significant value creation is more imminent than what the market thinks. PPK is not burning much cash and is well funded to execute over the next three years.

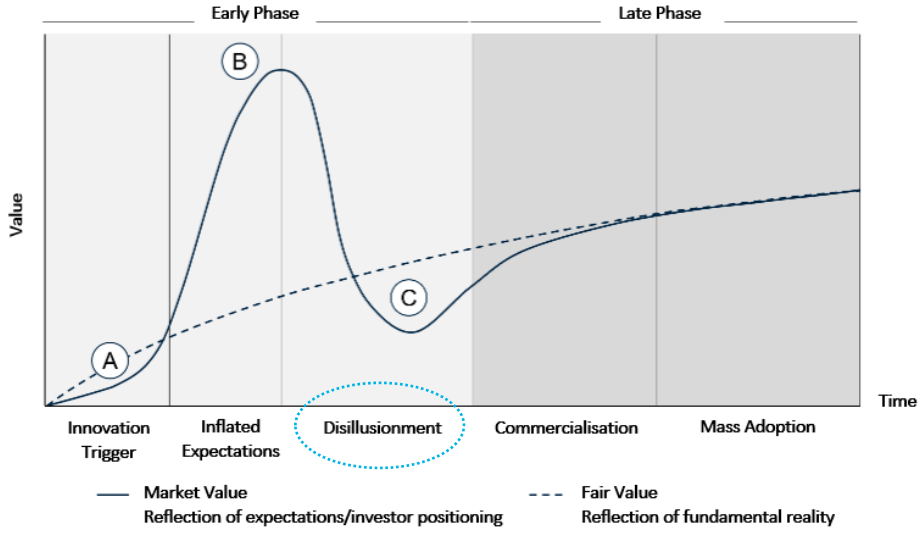
CONSIDERING THE HYPE CYCLE

Another way to think about PPK and the share market is to consider the technology hype cycle. The hype cycle is a visual representation of the maturity, market perception and adoption of new technologies, first popularised by research firm Gartner. Typically, the market will overestimate the

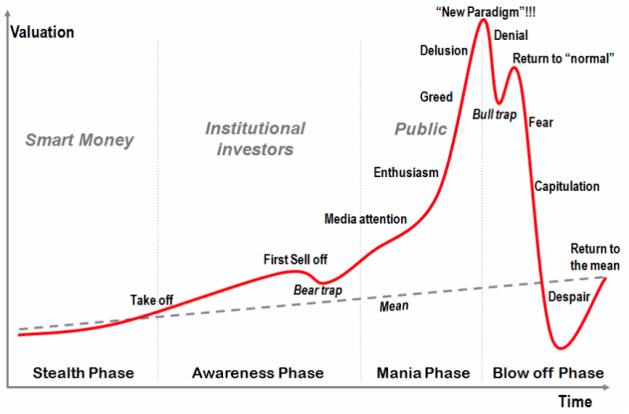
short-term potential of any new technology and it will underestimate its longer-term potential. These hype cycles have been observed consistently through time.

Whilst not initially designed for investing, the hype cycle can be useful to consider especially for early-stage businesses where market perceptions and not near-term earnings growth and cash flows are the main driver for valuations.

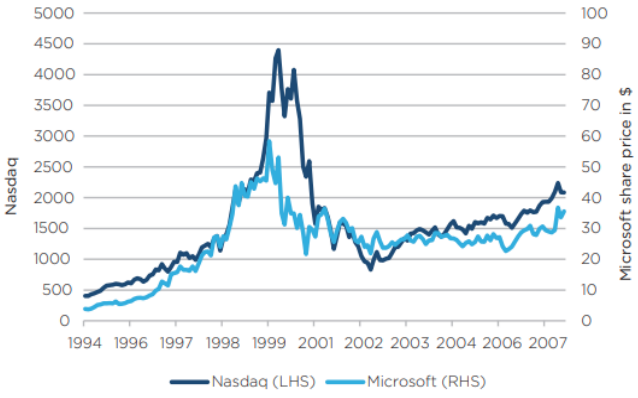
THE HYPE CYCLE



THE HYPE CYCLE APPLIED TO MARKET CYCLES



A PRACTICAL EXAMPLE: MICROSOFT AND THE NASDAQ - DOT COM BUBBLE



Source: Fidante, Foresight Guide, Philip Bold

The market perception of PPK is stuck at dissilusionment judging by the similarities between PPK's share price and the hype curve, and the significant disconnect between PPK's market value and fair value. We believe PPK is closer to the verge of commercialisation than what is showing in the current share price.

BNNT SALES POSSIBLY SOONER THAN EXPECTED

BNNTTL has a three-year lease with Deakin University with two additional three-year options for almost 1,000sqm of dedicated space at the secure Waurn Ponds Facility in Geelong. BNNTTL currently has two 4 furnace modules used to produce BNNT and two 6 furnace modules. BNNTTL's production capacity is around 10 kilograms per week at >95% purity. This is approximately 520kg's per year or over 1 tonne per year if PPK implements double shifting.

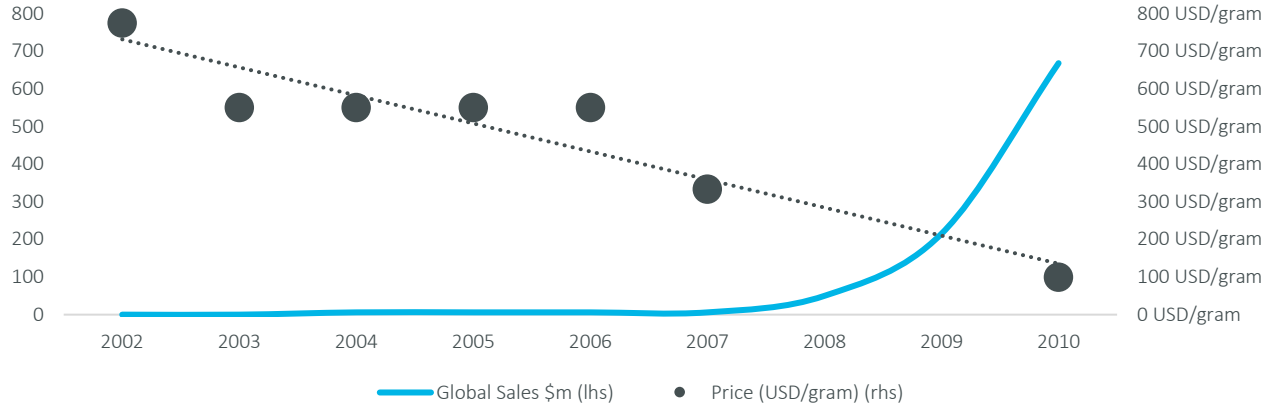
PPK's furnace modules have a low capital cost ($850,000 per machine) relative to revenue and are largely automated meaning that PPK has significant fixed cost leverage to reduce the cost to produce

BNNT as it scales production. BNNTTL has enough space to scale its production capability by up to 10 additional 6 furnace modules. We understand BNNTTL to be the lowest cost BNNT producer today.

Carbon Nanotubes (CNT) are an earlier nanotechnology that share the same atomic structure as BNNT. BNNT has much superior properties with wider commercial application opportunities. CNT's are an interesting case study. They too were very expensive to produce due to high energy costs.

Around 2002 the price for CNT's was ~$800/gram. By 2010 the price had reduced to ~$100/gram and global sales were beginning to significantly escalate.

CARBON NANOTUBE EARLY STATE PRICE AND GLOBAL SALES



Source: Nanotechnology by Ben Rogers, Sumita Pennathur, Jesse Adams, CRC press 2011, Global carbon nanotubes market – industry beckons, Vivek Patel 2011

It appears that the turning point in price/gram where CNTs started becoming commercially viable and global sales started picking up was about $100-$200 per gram. Given the similarities between CNT and BNNT we believe the unit economics of BNNT would look similar.

PPK currently has BNNT for sale on its website for $300/gram, and likely cheaper in larger quantities. This is significantly cheaper than the publicly listed prices of other BNNT producers.

BNNT TECHNOLOGIES LIMITED BNNT PRICE

PRICE LIST	
Quantity (gm)	**Price USD/gm**
1-30	**$400**
31-200	**$350**
201-500	**$300**
500+	**By negotiation**

COMPETING BNNT PRODUCERS

Competing BNNT Producer	>90% Purity: Price/gram
Nano Integris	1,000
BNNT LLC	800
Tekna	1,020

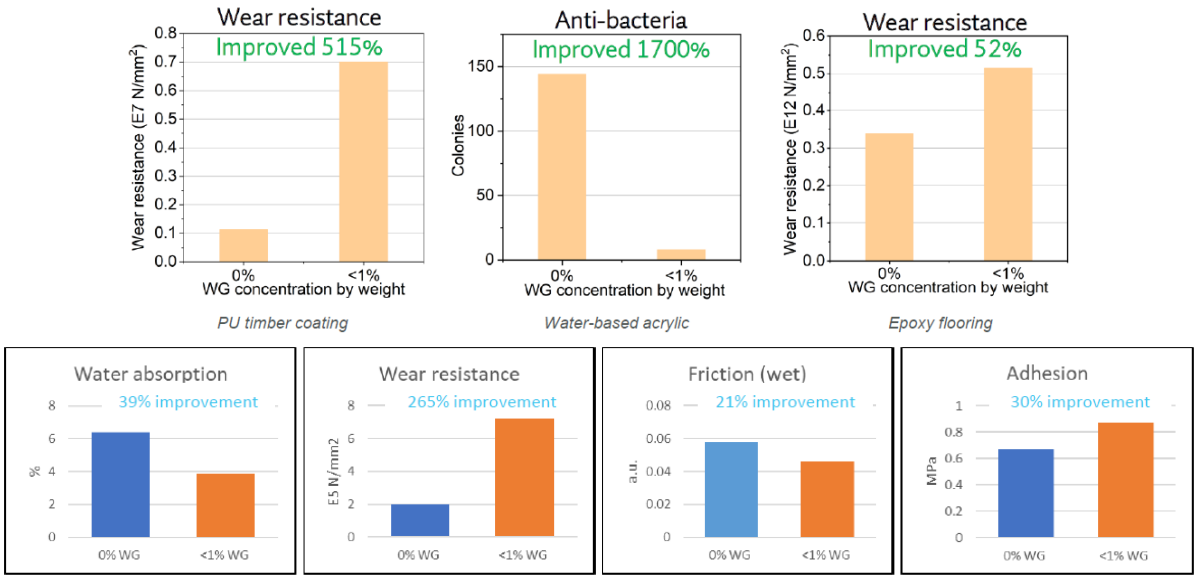
Source: https://www.bnnt.com.au/site/order-bnnt1, Nano Integris, BNNT LLC, Tekna

We are already seeing the first signs of BNNT sales from PPK. In April BNNTTL entered into a collaboration and distribution agreement with TenCate Advanced Armour. TenCate will purchase 250 grams of BNNT for infusion and testing into an agreed set of TenCate's products during 2023 to test and validate improvements in protection performance.

WHITE GRAPHENE LIMITED

White Graphene Limited completed a capital raise at a valuation around $73m in September 2022 creating significant value for shareholders that has not been realised by the market. The funds are intended to be used for the construction and commissioning of the commercial scale plant, further research and development of new materials for transport and storage of hydrogen, new high-performance coatings and commercialising new White Graphene products.

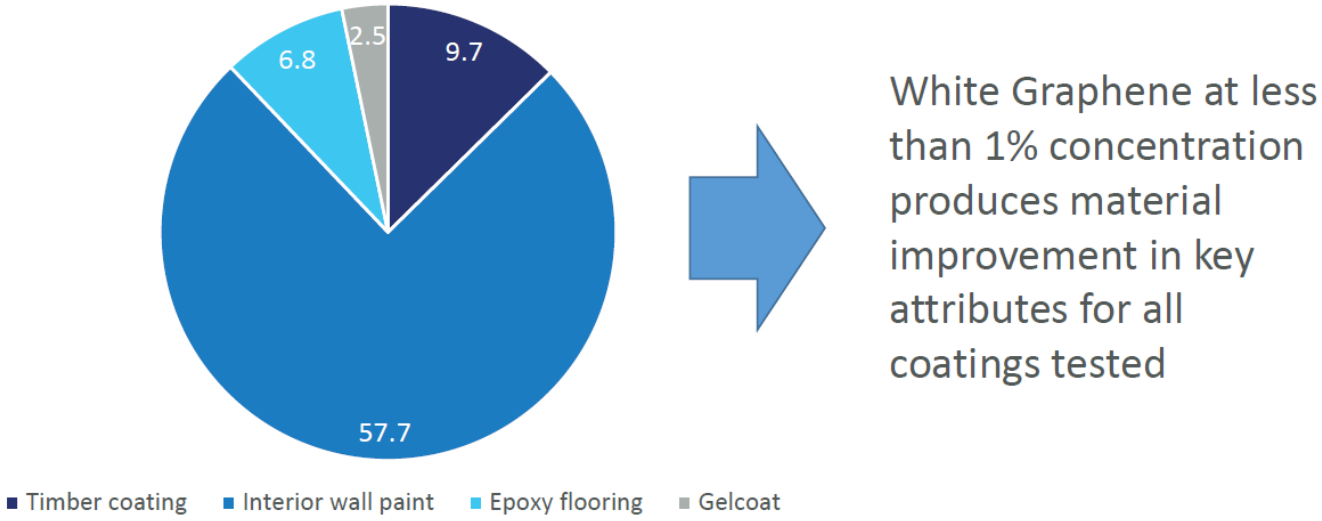
The production plant will scale production to around 2 kilograms per day over the next six months. This sets a strong path for near term commercialisation when combined with the White Graphene coating test results, which requires only <1% of white graphene to show significant improvements.



Source: PPK Group Presentation

The performance improvements that WGL has demonstrated will significantly reduce maintenance costs and improve asset life and utilisation rates. This article is an interesting read on the fuel and emission savings for oceangoing vessels from reducing water drag (via a gelcoat). PPK has mentioned that the company is actively working to commercialise white graphene with leading coatings companies suggesting that partnerships or commercialisation may be close.

The market for coatings and paints is approximately US$77 billion.



Source: White Graphene Limited presentation

LI-S ENERGY SOON TO INCREASE ENGAGEMENT WITH OEM'S

LIS has made several technological breakthroughs which could lead to a materially superior commercial battery that will enable significant leaps in the performance and capabilities of technologies that rely on battery energy.

Li-S Energy has announced that it has developed a 20-layer semi-solid state lithium Sulfur battery cell (GEN3). The new 20-layer cells are built using a low-flammability electrolyte, which will make them safer than traditional lithium Sulfur and lithium-ion battery cells.

Semi-solid state batteries enable the batteries to be lighter, less flammable, and more stable than traditional batteries, and are still easy to produce at a commercial scale.

Key benefits of the GEN3 Li-S Energy battery system over LIS' previous battery system include:

- A significant improvement in volumetric energy density (smaller size) as a result of using a lower porosity (and hence smaller) cathode material;
- Higher gravimetric energy density (lighter weight) through an optimised cathode material composition;
- Enhanced safety with the use of a low flammability electrolyte.

The new GEN3 cells are currently demonstrating a gravimetric energy density of over 400Wh/kg, and a volumetric energy density of 540Wh/l. Compared to current Li-ion cells this is nearly double the gravimetric energy density and comparable for volumetric energy density. A typical lithium-ion battery cell that can be found in current tesla electric vehicles has a gravimetric energy density ~220Wh/kg.

LIS is currently working to develop the cell cycle testing and characterisation results to produce an industry standard datasheet on the new 20-layer cells.

Li-S Energy's semi solid state battery is an excellent development for the company. Mainly we see two immediate benefits:

1. LIS has a better battery than before.
2. The semi solid state battery is more attractive to OEMs and should increase engagement.

LIS is currently working to develop the cell cycle testing and characterisation results to produce an industry standard datasheet on the new 20-layer cells.

POWERPLUS ENERGY

PPK's latest acquisition is a 51% stake (with a pathway to increase to 75% within 2 years) in PowerPlus Energy. PowerPlus Energy provides energy storage solutions for a network of just under 300 distributors and installers predominantly located in Victoria, New South Wales, Queensland and Western Australia

1. Modular and scalable battery energy storage solutions suitable for on and off grid power storage.
2. Stationary lithium batteries for off grid energy solutions.
3. Battery cabinets

PPK Group recognized the growing importance of the renewable energy sector and is diversifying into the stationary battery and clean energy solutions space, which will complement Li-S Energy batteries.

PowerPlus Energy is profitable and does annual revenue in excess of $25m per year, which should grow from here since PowerPlus Energy's facilities are only 1/3rd utilised. PPK has stated that through automation, strategic growth initiatives and other business process improvements, they will be working towards growing the annual revenue of PowerPlus Energy from over $25m to $100m within three years.

There are two interesting comparable companies that we can look to for an indication of PowerPlus Energy's potential.

1. Redflow Limited (ASX:RFX)
   - Produces Australian developed zinc-bromine flow batteries that are scalable and sustainable energy storage solutions.
   - The business generated $1.6m in revenue and lost $13.2m in NPAT in FY22 (unlike PowerPlus Energy which is profitable). Redflow has a market capitalisation of ~$45m.
   - The company has recently signed an agreement to deploy a 20MWh battery system in California for approximately US$12m.
   - Redflow California battery deal AFR article June 2023
2. RedEarth Energy Storage
   - A Queensland based company that provides Australian made on-grid and off-grid energy storage systems.
   - RedEarth is expecting 66% revenue growth in FY23 to hit $20m revenue.
   - Last year it raised $12m at a ~$100m valuation.
   - RedEarth AFR article May 2023

CRAIG INTERNATIONAL BALLISTICS GROWTH

CIB's manufacturing operations are close to 100% of capacity with FY22 revenues of $16m. CIB's forecasted pipeline anticipates that this demand is likely to continue for at least the next three years across the mix of the CIB product suite. CIB was delivered, commissioned, and has installed a US-made autoclave which is expected to be operational for the 2023 calendar year. Autoclaves use high temperatures, levels of pressure, and often vacuums to cure and process a wide range of materials. They are also used to introduce additional additives to a material. The autoclave will enable CIB to further diversify and grow revenues through new and/or enhanced products and capabilities.

Russia's ongoing invasion of Ukraine, and uncertainty of further military actions against neighbouring countries in Eastern Europe, has heightened global uncertainty with defence forces increasing their expenditure in the defence sector. CIB has seen increased inquiries from a broad range of customers and is well positioned to meet their needs.

ADVANCED MOBILITY ANALYTICS

Advanced Mobility Analytics aims to be the world leading digital platform provider for proactive road safety analytics and management, applying more than 70+ years of cumulative road safety knowledge to develop a comprehensive road safety management suite of modules.

AMAG has released the world's first Software-as-a-Service (SAAS) using artificial intelligence, video analytics, deep learning and advanced econometric technologies to manage road safety.

AMAG's success in Australia has seen the business receive international interest especially in North America. AMAG has strengthened its presence in North America with the appointment of key senior hires with strong transport capabilities and networks to build and deliver opportunities related to the Bipartisan Infrastructure Bill.

We believe that AMAG will start to meaningfully grow revenue through 2023. The company has a target to be cashflow breakeven in the next 12 months.

AMAG is targeting the global traffic management market which consists mainly of government local councils around the world. This market is estimated to be worth $600 million annually.

THINKING ABOUT RISKS

Source: BOEQ

Risk	Description	Severity	Probability	BOEQ Comments
1	Failure to produce BNNT at a commercial quantity and price	10	10%	With many of PPK's investments relying on the supply of BNNT at commercial quantities and at a commercial price, clearly it would have serious commercial implications if PPK was unable to achieve these targets. The cost of production continues to decline as the company achieves scale. We are confident that PPK will be able to produce BNNT at commercial prices and at scale. Current production capacity is expected to increase to around 10 kilograms per week at >95% purity at commercially viable costs during CY23. PPK has significant fixed cost leverage as it scales production.
2	Timeframe to realise return on investments is longer than expected	5	30%	Research and development projects typically have a 2–3-year time horizon and need to go through the process of commercialisation following that. Delays or longer than expected commercialisation periods could give rise to negative market sentiment which would drag on PPK's share price. We believe that PPK is well on track with current commercialisation projects.
3	Competitors acquire knowledge to produce BNNT and White Graphene at commercial prices	4	50%	Competitors producing BNNT and White Graphene at scale and at commercial prices would likely compete away PPK's returns. It would be difficult to differentiate these products therefore the only commercial advantage would be to lower prices. Currently we believe that PPK is the only organisation that can produce these materials at scale and at commercial prices.

HOW WE GET TO OUR TARGET PRICE

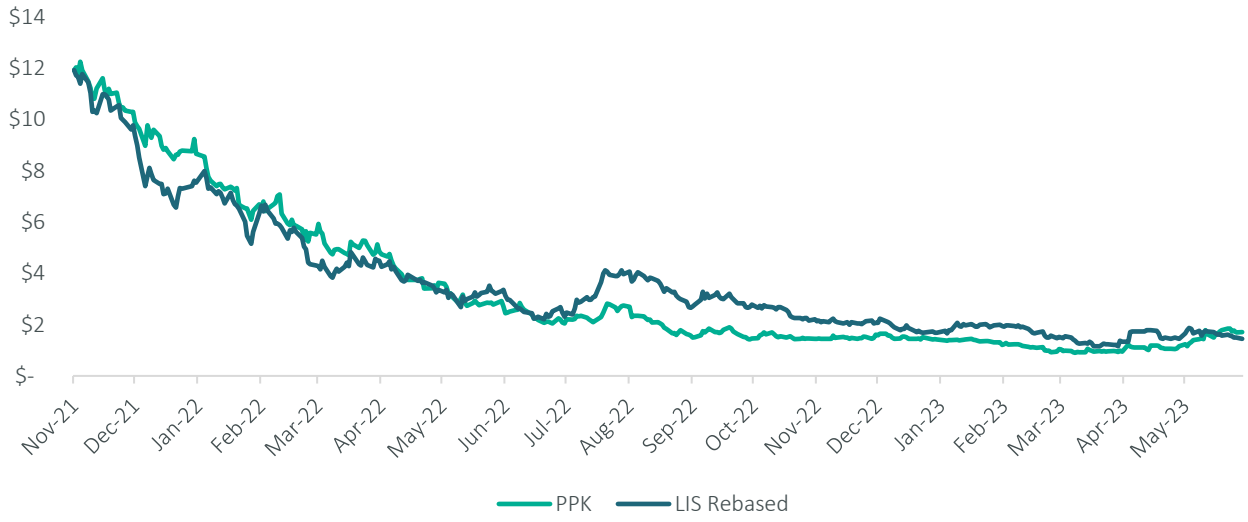
PPK is below fair value if you simply mark-to-market the company's investments and assets.

PPK's has a direct ownership of 45.4% in Li-S Energy which is listed on the ASX (ASX:LIS). Note that PPK has an additional indirect ownership of 4.7% in LIS through its stake in BNNNTTL, of which PPK owns 51%.

TABLE 1: THE VALUE OF PPK'S DIRECT OWNERSHIP IN LIS

	Price	Shares on Issue	Restricted Shares	Total Shares	Market Capitalisation	Cash*	Debt	Enterprise Value
LIS	0.26	640.2	2.2	642.4	167.0	38.1	0.0	128.9
PPK	1.44	89.3	0.0	89.3	128.6	4.0	2.8	127.3
*PPK Group directly owned cash	4.0							
PPK % ownership of LIS	47.7%							
Market value of PPK's interest in LIS	**79.7**							
PPK Market Capitalisation	**128.6**							

PPK VS LIS SHARE PRICE POST LIS IPO



Source: IRESS, BOEQ

TABLE 2: THE VALUE OF PPK'S OWNERSHIP INTERESTS

	Fair Value	PPK Ownership %	Fair Value of PPK Ownership
BNNT Technologies Limited: Fair value of BNNTTL net assets $21m + Goodwill $29m	50.3	51.0%	25.7
White Graphene Limited: recently completed a capital raise with valuation of $73m	73.3	59.4%	43.6
PowerPlus Energy	13.1	75.0%*	9.9
Craig International Ballistics: Purchased at $10m valuation. CIB is now 3x more profitable.	30.0	45.0%	13.5
Advanced Mobility Analytics Group: Raised $3m at $14m valuation	14.0	32.5%	4.6
Ballistic Glass: Book value of $0m	0.0	40.0%	0.0
3D Dental: Book value of $0m	0.0	45.0%	0.0
Strategic Alloys: Book value of $0m	0.0	45.0%	0.0
Precious Metals: Book value of $0m	0.0	45.0%	0.0
Total fair value of PPK's investments	**180.7**		**97.1**
Market value of PPK's direct interest in LIS	167.0	47.7%	79.7
PPK Equity Market Value			**176.8**
PPK Equity value per share			**1.98**

* In our valuation we assume PPK will continue on its pathway to acquire 75% of PowerPlus Energy.

On a simple fair value basis PPK is worth at least $1.98 per share.

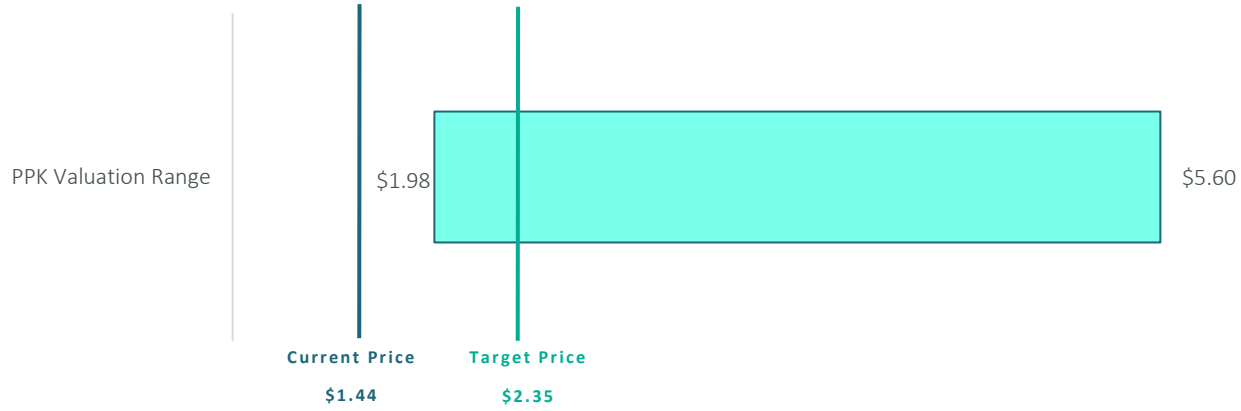
Clearly this is just a minimal base case and does not include any upside if any of PPK's investments are commercially successful. If PPK's other investments are successful there could be material upside and a significant re-rating of the stock.

BNNT Technologies Limited, White Graphene Limited and Li-S Energy have the potential to be billion-dollar businesses alone if they can successfully execute commercialisation, and Advanced Mobility Analytics has revolutionary technology that is on the verge of a large commercialisation opportunity.

As we explored earlier in this report two comparable companies to PowerPlus Energy, Redflow (ASX:RFX) and RedEarth Energy, are valued at ~$45m and $100m respectively. PowerPlus Energy does more revenue than both and is profitable. It has the potential to be worth a significant portion of PPK's market capitalisation.

In our Li-S Energy (ASX:LIS) research we have valued LIS at $1.40 per share. If we repeat the above exercise PPK's valuation is $5.60 per share.

Our final weighted target price for PPK is $2.35 per share.



FINANCIAL SUMMARY

Profit & Loss Analysis (Restated for discontinued PPK Mining)

(A$m)	FY20A	FY21A	FY22A
Revenue	-	-	**1.6**
Depreciation & amortisation	- 2.4	- 2.5	- 1.2
EBIT (underlying)	**5.1**	**- 6.0**	**- 2.9**
Other items	3.4	0.7	4.5
Net finance costs	-	-	- 0.1
Income tax expense	- 0.2	0.6	0.5
Non-controlling interests	- 0.0	- 0.8	- 4.6
Equity owners net profit after tax (underlying)	**8.3**	**- 5.5**	**- 2.6**
Equity owners net profit after tax	**8.3**	**- 5.5**	**- 2.6**

Basic EPS (cents)	9.80	- 6.30	- 8.00
Diluted EPS (cents)	9.70	- 6.30	- 8.00
DPS (cents)	-	2.00	-
Special dividend (cps)	-	2.50	2.81

Ratio Analysis

	FY20A	FY21A	FY22A
Revenue growth			
EBITDA margin			-101.7%
EBITDA growth		-146.7%	-52.2%
EBIT margin			-176.4%
EBIT growth		-216.9%	-51.4%
Equity holders NPAT growth		-166.3%	-53.2%
EPS growth		-164.3%	27.0%
DPS growth			
Payout ratio	0.0%	-31.7%	0.0%
Dividend yield	0.0%	1.4%	0.0%
Tax rate	4.1%	9.7%	7.2%

Cash Flow

(A$m)	FY20A	FY21A	FY22A
Net cash flows	3.6	-2.7	-7.4
Interest paid	-0.3	-0.1	-0.2
Income taxes paid	0.0	0.0	-0.7
Other	0.0	0.1	0.2
Net cash from operating activities	**3.3**	**-2.7**	**-8.1**
Payments for property, plant and equipment	-0.7	-0.8	-2.9
Payments for intangibles	-1.5	-2.3	-4.8
Other	-3.4	-3.0	4.2
Net cash used in investing activities	**-5.6**	**-6.1**	**-3.5**
Proceeds from issue of shares	11.8	38.2	35.2
Net proceeds from borrowings	5.2	0.4	2.3
Repayment of borrowings	-7.3	-0.2	0.0
Dividends paid	-0.7	-0.4	-1.0
Other	-2.2	-3.7	-2.2
Net cash from / (used in) financing activities	**6.7**	**34.4**	**34.2**
Net change in cash and cash equivalents	**4.4**	**25.6**	**22.6**
Cash at beginning of the period	1.0	5.3	30.4
Cash and cash equivalents at the end of the period	**5.3**	**30.4**	**53.0**

Balance Sheet Analysis

(A$m)	FY20A	FY21A	FY22A
Cash and cash equivalents	5.3	30.4	53.0
Total assets	**64.2**	**96.6**	**121.0**
Debt	0.2	0.4	2.8
Lease Liabilities	3.7	0.0	1.3
Total liabilities	**10.0**	**8.3**	**8.4**
Contributed equity	59.5	75.3	62.2
Reserves	4.1	19.1	39.0
Retained profits	-11.3	-17.9	-19.5
Non-controlling interest	2.1	11.6	31.1
Total equity	**54.2**	**88.3**	**112.6**

Ratio Analysis

	FY20A	FY21A	FY22A
Enterprise value	123m	99m	78m
Net Debt	-5.2	-30.0	-50.3
Net Debt / Equity	-10%	-34%	-45%
Net Debt / (Net Debt + Equity)	-11%	-51%	-81%
EBIT /Net Interest	-1.0x	15.1x	1.3x

(A$m)	FY20A	FY21A	FY22A
BNNT Technologies Limites			
Revenue	0.0	0.5	0.1
Net Profit	2.2	17.7	-2.1
PPK Share of NPAT	**-0.1**	**-0.5**	**-1.1**
Equity	8.0	23.7	21.4
PPK carrying amount	**19.2**	**20.7**	**10.9**
Li-S Energy			
Revenue	0.0	0.0	0.0
Net Profit	0.0	-1.7	-6.3
PPK Share of NPAT	**0.0**	**-1.2**	**-3.2**
Equity	5.0	22.7	51.0
PPK carrying amount	**2.9**	**12.0**	**24.3**
White Gtahpene Limited			
Revenue	0.0	0.0	0.0
Net Profit	0.0	-0.2	-1.8
PPK Share of NPAT	**0.0**	**-0.2**	**-1.0**
Equity	0.0	2.4	2.6
PPK carrying amount	**0.0**	**1.6**	**1.7**
Craig International Ballistics			
Revenue	11.3	8.6	15.9
Net Profit	1.4	1.1	-0.3
PPK Share of NPAT	**0.6**	**0.5**	**-0.1**
Equity	13.0	13.3	12.3
PPK carrying amount	**5.9**	**5.8**	**5.4**
Advanced Mobility Analytics Group			
Revenue	0.0	0.1	0.6
Net Profit	0.0	0.0	-0.2
PPK Share of NPAT	**0.0**	**0.0**	**-0.1**
Equity	0.0	7.5	10.8
PPK carrying amount	**0.0**	**1.5**	**3.8**

Source: BOEQ, PPK accounts & presentations

APPENDIX

BOARD AND MANAGEMENT

Robin Levison (Non-Executive Chairman)

Appointed as a Director and Executive Chairman on 22 October 2013. Robin became Non-Executive Chairman from 1 July 2022.

Mr Levison is also Chairman of ASX listed Mighty Craft (ASX:MCL), is the recently retired Chairman of Retirement Village operator Eureka Group Holdings Limited (ASX: EGH) and from 2005 -2013 was Managing Director and CEO of ASX 200 listed mining services company Industrea Limited (ASX:IDL) which was acquired by US based General Electric (GE). He then served as Global Director of M&A with GE Mining.

Mr Levison holds a Master of Business Administration (MBA) from the University of Queensland, is a Chartered Accountant and is a Graduate and Fellow of the Australian Institute of Company Directors.

Glenn Molloy (Executive Director)

Member of the PPK Group Limited Board since listing on 21 December 1994.

Mr Molloy founded the former entity Plaspak Pty Ltd in 1979 and has acted as a director of the consolidated entity since that time. He has extensive experience on public company boards, and in advising publicly listed and private entities on commercial aspects of mergers, acquisitions and divestment activities.

Mr Molloy was appointed to the role of Executive Director in September 2009 following the retirement and resignation of David Hoff as Managing Director.

Anne-Marie Birkill (Non-Executive Director)

Appointed as Non-Executive Director on 1 July 2022.

Anne-Marie is a company director with experience as an executive and non-executive director for private, public, industry and government boards and committees. With expertise and experience in the innovation and investment sectors, she has largely served on the boards of technology companies and organisations that support and finance such companies. Anne-Marie's professional career includes over 30 years' experience in commercialisation and product development. She is a co-founder and director for OneVentures, a venture capital firm that invests in technology companies with global potential. Her previous executive roles have included CEO for i.lab technology incubator and General Manager for UniQuest, The University of Queensland's technology commercialisation company.

Anne-Marie is an active participant in the innovation community, speaking at a wide range of events, and is a mentor particularly for other women working in the finance sector. She is a GAICD.

Anne-Marie holds a BSc(Hons) and MBA.

Anthony McDonald (Non-Executive Director)

Appointed as a Director on 13 September 2017.

Mr McDonald has extensive experience as a lawyer and a director of listed public companies including previously ASX 200 listed mining services company Industrea Limited which was acquired by General Electric (GE). He has been involved in the natural resources sector in Australia and internationally for many years.

Mr McDonald is also a non-executive director of ASX listed Santana Minerals Limited.

Mr McDonald holds a Bachelor of Laws degree from Queensland University of Technology.

PPK'S INVESTMENTS IN DETAIL

Investment	Direct Ownership %	What it does	Technological Advancement	Potential Applications	BNNTTL Reliant
BNNT Technologies Limited	51.0%	Develop, manufacture and commercialise Boron Nitride Nanotubes BNNT's. BNNT's have extraordinary mechanical properties. They are stronger than any metal or carbon fibre, extremely flexible, excellent thermal conductors, optically and infrared transparent, chemically stable, able to withstand extreme temperatures, have neutron shielding capability and are electrical insulators.	BNNTTL is the only known company to have figured out how to produce BNNT at scale and at a price that is suitable for commercial applications.	BNNT's are considered the world's strongest and most advanced fibre and offer significant material benefits in aviation, automotive, space travel, power generation, batteries, electronics and defence.	Y

Investment	Direct Ownership %	What it does	Technological Advancement	Potential Applications	BNNTTL Reliant
Li-S Energy (ASX:LIS)	47.7%	LIS is developing advanced lithium-Sulfur battery technology, where BNNT's and other nanomaterials are incorporated into battery components to: - improve battery energy density when compared to current lithium-ion batteries; and - improve cycle life when compared to conventional lithium-Sulfur batteries. Lithium-Sulfur battery chemistry presents many benefits over current lithium-ion battery chemistry, including having more than five times the theoretical energy density, being lighter, safer, and using more environmentally friendly raw materials.	Lithium-Sulfur batteries have yet to be mass produced as previous conventional lithium-Sulfur batteries tended to fail after a low number of recharge cycles, making them useless for most commercial applications. LIS believes that its BNNT battery construction addresses the key historical challenges of conventional lithium-Sulfur batteries, and testing to date indicates that BNNTs substantially enhance the performance, capacity, stability and cycle life in the Li-S Energy battery compared to an identical lithium-Sulfur battery without BNNTs.	We believe that Li-S Energy's technology and application of BNNT is a huge breakthrough in the non-stationary battery industry as it enables one of the most lightweight, efficient and energy dense battery compositions to be suitable for near term commercial use. The adoption of these batteries will enable significant leaps in the performance and capabilities of technologies that rely on battery energy, including electric vehicles (EV), drones and general aviation, consumer electronics, and the internet of things.	Y

Investment	Direct Ownership %	What it does	Technological Advancement	Potential Applications	BNNTTL Reliant
White Graphene Ltd (WGL)	59.4%	White graphene is a nanomaterial termed boron nitride nanosheet (BNNS) and referred to as white graphene due to its unique quality to be almost transparent and its ability to be coloured unlike conventional black graphene. WGL is aiming to manufacture White Graphene on a commercial scale and expects its unique manufacturing process to produce low-cost high quality White Graphene to market end users.	BNNS shares its structure with carbon graphene (the Nobel Prize winning material), but it is white in appearance (graphene is black). Graphene is the thinnest compound known to man at one atom thick, the lightest material known, the strongest compound discovered, the best conductor of heat at room temperature and the best conductor of electricity known. White Graphene possesses very high thermal conductivity, micro tensile strength, thermal and chemical stabilities, corrosion resistance, neutron & radiation absorption, nano energy harvesting	White Graphene's properties are all superior compared to carbon graphene and it has many potential applications. Its unique properties, chemical stability and ability to colour and combine with metals, polymers and ceramics makes it a valuable addition to a broad range of materials and electronics: - **Medical**: 3D printed prosthetics, drug delivery systems. - **Composite materials**: Super strong metals, unbreakable polymers. - **Electronics**: Super computers, flexible and multilayered circuitry. - **Energy systems**: Flexible energy storage, better batteries - **Apparel & safety**: Radiation shielding and toughened fabrics. - **Industrial products**: Water filtration systems, desalination, corrosion resistant coatings, fire retardant coatings. - Hydrogen and other specialist gas piping - Relining swimming pool moulds - Under vehicle protection especially in salt road affected areas.	Y

Investment	Direct Ownership %	What it does	Technological Advancement	Potential Applications	BNNTTL Reliant
PowerPlus Energy	51.0% (Pathway to 75% ownership)	PowerPlus provides reliable, long-lasting energy storage solutions. It designs and manufactures Australian-made batteries, cabinets, and battery energy storage solutions for a wide range of renewable energy projects.	What sets PowerPlus Energy apart is its expertise, track record, and reputation within the energy storage market. The company's ability to combine battery and storage technologies, optimize their performance, and deliver reliable and efficient energy storage solutions is where its breakthrough lies. PowerPlus Energy's specific innovations, proprietary processes, and unique approaches to integration and scalability contributes to its differentiation within the industry.	Stationary clean energy solutions for on and off grid applications.	N
BNNT Precious Metals	45.0%	Precious Metals is a project designed to test the infusion of BNNT as a nano-reinforcement into gold and silver to enable superior strength, hardness and durability of these metals for both industrial and the jewellery market.	Gold and silver have amazing benefits and uses however they are so soft that they need to be alloyed with other metals which compromises their inherent effectiveness, properties and value. BNNT introduces a nano-reinforcement to the pure metals to give them superior strength, hardness and durability. The expected outcome will be Ultra Gold and Ultra Silver as pure metals (not alloyed) with their molecular structures enhanced with a BNNT integrated reinforcement.	Gold and silver foils are used in industries such as electronics, aviation and space. They can then be utilised at less weight and cost to achieve the same, or better performance specifications. Harder, stronger and more wear resistant gold and silver will also create significant new opportunities for jewellery products and automated jewellery manufacturing.	Y

Investment	Direct Ownership %	What it does	Technological Advancement	Potential Applications	BNNTTL Reliant
Strategic Alloys	45.0%	This project focuses on creating a super strength aluminium and manganese alloy by introducing BNNT into its formulation. The research and development project has also been expanded to include base metal additive manufacturing for aluminium, nickel and titanium.	The new super strength aluminium alloy includes BNNT in its formulation, which acts as a nano-reinforcement in certain metals, significantly improving mechanical properties. Development of this technology will give rise to new IP and create opportunities for high end applications across the aerospace and defence industries as well as other high-performance markets.	Multiple applications exist for super strength aluminium alloys and super strength titanium alloys with industries including aerospace, aviation and defence seeking materials that are lighter, stronger, more heat resistant and more durable.	Y
Ballistic Glass	40.0%	This project is to infuse BNNT in bullet resistant glass to improve resistance at a significantly lower weight. The technology not only involves the addition of the BNNT but also the development of new manufacturing methods in laminating both transparent and non-transparent composite materials.	Improved resistance at a significantly lower weight will result in cost savings together with greater protection.	Automotive, architectural, marine, military and security purposes	Y
3D Dental	45.0%	The purpose of this project is to infuse BNNT into frequently used dental materials including zirconia and lithium disilicate ceramics.	The project is expected to lower the failure risk of most forms of dental implants.	Dental applications	Y

Investment	Direct Ownership %	What it does	Technological Advancement	Potential Applications	BNNTTL Reliant
Craig International Ballistics (CIB)	45.0%	CIB is a leading supplier of body armour to the Australian Defence Force and Police Forces. - Personal protection: covert and overt body armour for security, military and police use. - Survivability solutions: manufactures armour panels for aircraft and marine vessels. - Transparent Armour: Bullet resistant glass with superior performance	Advancing research into a range of BNNT potential uses including new manufacturing processes for transparent materials such as polycarbonate, perspex, acrylic and glass to enhance ballistic resistance performance whilst reducing weight and/or thickness and Reinforced Transparent Armour	Australia's largest manufacturer of overt and covert body armour and tactical ballistic shields for police forces and security companies, both domestically and internationally. Defence, police force and security applications	Partial
Advanced Mobility Analytics Group (AMAG)	32.5%	Advanced Mobility Analytics aims to be the world leading digital platform provider for proactive road safety analytics and management, applying more than 70+ years of cumulative road safety knowledge to develop a comprehensive road safety management suite of modules. AMAG has released the world's first Software-as-a-Service (SAAS) using artificial intelligence, video analytics, deep learning and advanced econometric technologies tomanage road safety	AMAG have solved the challenge of predictive analytics for road safety. AMAG predicts potential road incidents using artificial intelligence that processes images/videos in real time with 99.97% accuracy vs the current standard of 70% accuracy.	AMAG's SMART Digital Platform will enable city deployments and governments around the globe to proactively manage road safety on their transportation networks and reduce crash risk for all road users. Usage trials are underway in Australia & North America.	N

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