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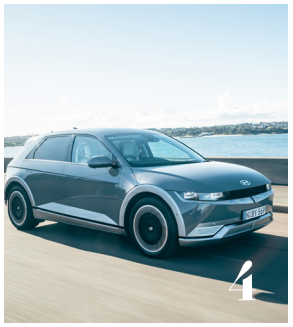
AUGUST 2022

BATTERY METALS

THE FY2023 POWER MOVE

Why battery metals are driving the green energy revolution and how to best play the field

CONTENTS



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EDUCATION

4 Battery metals: Behind the boom

5 How to value battery metal stocks

MARKET INSIGHTS

6 The auto giant deals

7 The EV push gains pace

8 Time for copper stocks

9 Four must-see lithium stocks

FEATURED COMPANIES

11 Alma Metals

12 Alpha HPA

13 Alvo Minerals

14 Anax Metals

15 Arizona Lithium

16 Australian Vanadium

17 Azure Minerals

18 Black Canyon

19 Black Rock Mining

20 Cannon Resources

21 Cazaly Resources

22 Cobalt Blue Holdings

23 Conico

24 Eagle Mountain Mining

25 European Lithium

26 Evolution Energy Minerals

27 Firetail Resources

28 FYI Resources

29 Global Lithium Resources

30 Golden State Mining

31 Infinity Lithium

32 International Graphite

33 Latin Resources

34 Lunnon Metals

35 NickelSearch

36 Norwest Minerals

37 Panther Metals

38 QEM Limited

39 Ragnar Metals

40 Sovereign Metals

41 Technology Metals Australia

42 Venture Minerals

43 Vulcan Energy Resources

Volkswagen ID Buzz, the new fully electric-driven microbus of Volkswagen Commercial Vehicles

BATTERY METALS

Reuben Adams

Editor's letter

Investing in the green energy revolution

REUBEN ADAMS

Analyst Howard Klein calls battery metals "one of the best secular investment themes of our time".

His take on the scale of investment needed in mining and refining lithium, nickel, graphite, and other raw materials is that it will be measured in the trillions of dollars.

Of course, the battery metals sector is still in its infancy.

That means volatility.

Take lithium stocks, for example, which suffered a fairly shocking selldown last month after major investment bank Goldman Sachs broke up the party by calling the top of the battery metals boom.

Experts – sorry Goldman – aren't buying it. But it's true that a long-term perspective is required for this multi-decade cycle.

It took a full five years for electric vehicle sales to reach 1 million in 2015. In 2022, we are hitting those numbers in weeks and months.

And things are only going to get more hectic as the European Parliament's environmental committee gathers support for an EU plan to ban new petrol and diesel car sales from 2035.

This is great for graphite, nickel, cobalt, lithium and rare earths stocks. And collectors of classic muscle cars.

Just over 18 months ago lithium stocks were in the proverbial crapper. Prices are now near all-time highs, thanks to increasingly aggressive EV targets and the sudden realisation there actually isn't enough of it to go around.

The EV industry is also set to drive 700% growth in natural graphite demand by 2025.

Meanwhile, Roskill forecasts the demand for nickel and cobalt chemicals will grow by over 500% and 100%, respectively, between 2021 and 2030 – and the race to secure "green" battery-grade nickel units is intensifying.

Rare earths are running hot. Lynas (ASX:LYC) – the only scale producer of separated rare earths outside China, for now – is raking it in.

> "Battery metal ... one of the best secular investment themes of our time"

EVs also contain about four times as much copper as conventional cars. This could push copper above $US20,000 per tonne, up from a current price of ~$US9000/t, experts say.

"This sector is very immature, niche and underfollowed by institutional investors and sell side analysts," Klein says.

"Like Tesla several years ago, retail investors who educate themselves about this sector generally and individual companies specifically have an opportunity to accumulate life transforming wealth."

EDITORIAL

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NEXT ISSUE

Investor Guide: Gold 22/23
Date: September 2022

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EDUCATION OVERVIEW

Battery metals: Behind the boom

They're the hot ticket item on the Aussie markets at the moment, for some obvious – and some not-so-obvious reasons. Here's a look at why everyone's going gangbusters for our battery metals.


Peter Strachan


2022 Tesla Model Y RWD and Hyundai Ioniq 5 RWD

PETER STRACHAN

The International Renewable Energy Agency reports that installed costs of utility scale photovoltaic power generation (PV) fell by 81 percent in the decade to 2020, and costs for large scale wind generation are also plummeting as individual, offshore turbines spread fixed cost over 15-megawatt units.

The key to integrating intermittent, rebuildable generation capacity into a power grid is grid-scale storage capacity! Rapid electrification of everything requires power storage using gravity, solid state, stored hydrogen manufacture, flow battery chemistries, thermal storage, flywheel and even the 161-year-old **lead**-acid battery.

Rapid battery technological evolution seems certain, adding complexity to choices around which raw materials will benefit the most.

Lithium-ion (Li-ion) battery chemistries have a firm foothold for booming electric vehicle (EV) and mobile equipment markets. Rapid technological advance and economies of scale have reduced Li-ion battery costs by 97 per cent since 1991. Hot on its heels, cheaper sodium-ion (Na-ion) battery is beginning to make inroads as its energy density rises. Cheaper and thermally stable Na-ion batteries may find application for short distance transport and grid scale stationary power storage, where their extra weight is not an issue.

Low hanging fruit in this area remains the electrification of transport. Electric vehicles have adopted Li-ion battery chemistries, while several battery technologies are in use or in development to compete for stationary power storage. South Australia's Hornsdale Li-ion battery can store 193.5 megawatt hours of power and deliver up to 150 megawatts into the grid.

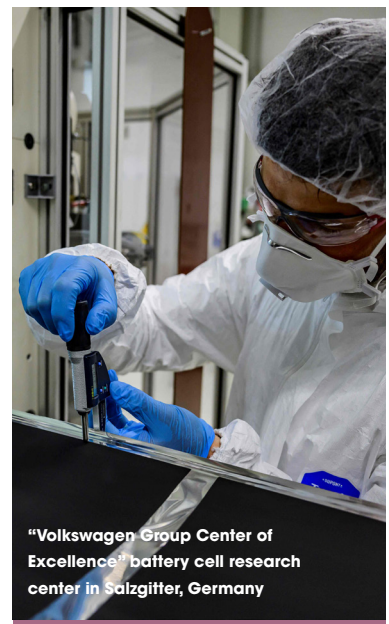
Demand for **lithium carbonate** looks set to jump by an eye-watering 10-fold by the late 2030s from current market of +500,000 tonnes of lithium carbonate equivalent pa, with supply shortfalls predicted, all of which should support lithium pricing over coming decades. Current contract pricing for lithium carbonate sits at around US$46-$50 per kilogram, with spot sales at up to US$73/Kg, a 10-fold increase on pricing nadir of early 2020.

Sulphates of **nickel**, **cobalt** and manganese find application in the cathodes of about 45% of Li-ion batteries, but lithium, iron, phosphate (LFP) batteries have become a mainstay for Tesla EVs with other marques likely to follow. Despite this trend, demand for nickel and cobalt in battery cathode application, is expected to growth through the 20s and 30s, providing price support as the bulk of metal demand is driven by traditional industrial activity cycles.

> "Demand for lithium carbonate looks set to jump by an eye-watering 10-fold by the late 2030s"

All Li-ion and Na-ion batteries require purified, spherical **graphite** for anodes, which sees graphite demand set to increase from 400,000 tonnes per annum at a pace of 17 per cent per annum through until 2040. Application of carbon allotrope **graphene** in battery technologies could further expand underpinning graphite demand beyond existing industrial applications.

Flow battery chemistries, like **vanadium redox** and **zinc bromide**, store power in electrolyte as it passes through the battery chamber, offering long-lived, efficient, and thermally stable storage over extended periods. Expansion of application would have a demand impact for zinc and vanadium into the 2030s and beyond.


"Volkswagen Group Center of Excellence" battery cell research center in Salzgitter, Germany

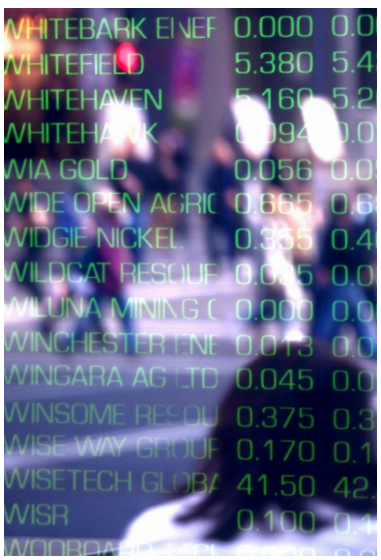
QUICK FACTS

Key cathode metals used in Li-ion batteries include sulphates of nickel and cobalt along with manganese.

Anodes for all types of solid-state batteries require graphite, while the electrolyte is made up of the carbonate or hydroxide of lithium. Lead, vanadium and zinc are used in other battery technologies and chemistries.

How to value battery metal stocks

Your checklist for success in the clean energy sector



PETER STRACHAN

Back the jockey

Management quality of companies takes a high priority when searching for value, especially in smaller resource stocks where often, backing the jockey is a key ingredient for success.

Value and rank minerals in the ground

Beyond the price to earnings ratio and dividend yield that are more commonly associated with ranking industrial stocks, resource companies can be ranked by their enterprise value (EV=market capitalisation minus net cash) per tonne of product. Producers attract a high EV multiple of Mineral Reserves, while explorers rank in value depending on geopolitical risk, access to infrastructure, cash in the bank and the size, grade, geometry, and depth of Mineral Resources.

Ranking EV per tonne or grade of contained lithia or graphite is a helpful tool.

Production costs of 6% Li2O concentrate have jumped from around US$440 per tonne in 2019 to around US$800 per tonne today, while contracted spodumene concentrate delivered to Asian markets sells for around US$3,000 and up to US$6,600 per tonne for spot parcels at auction, up from less than US$400 per tonne in 2019.

If the insitu value of recoverable metal per tonne of ore Reserves is higher than the estimated costs of mining, processing, and shipping, then the project has potential.

Grade and business plan

Most hard rock, pegmatite hosted lithium deposits globally have grades ranging from 0.9% to 1.4% of Li2O with the Greenbushes mine holding the outlier status at over 2% Li2O. Be wary of one, deep or wide, high-grade intercept of a target metal, especially if 80% of the contained valuable metal is found in a narrow, higher-grade portion of the intercept. Selective sampling of clearly mineralised rocks by eager geologists are not representative, so take care of loud noises about geochemical assays or rock-chip sampling that can misrepresent a target.

Be careful of companies claiming to apply unproven processing technology at any stage between mining to final product. In early days, pioneering efforts nearly sent one company broke trying to commission a lithium carbonate plant in China when it reached only 50% of nameplate capacity after 18 months of operation and still hadn't secured significant market acceptance of its high-quality product.

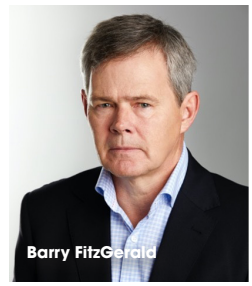
Lanthanide elements

While rare earth elements are not strictly battery metals, roles played by terbium, neodymium, praseodymium, and dysprosium in making permanent magnets, provide an essential link for wind power generation and in electric motors. Additionally, low energy lighting solutions that make substantial contributions to decarbonizing the economy require small amounts of yttrium and europium rare earths.

MARKET INSIGHTS

Lit gets real

Despite claims the boom is over, seismic auto giant deals signal a new growth chapter for the lithium industry


Barry FitzGerald

An Audi Q4 e-tron electric vehicle (EV)

BARRY FITZGERALD

Two deals struck between ASX-listed lithium project developers and overseas auto giants in June are being seen as seminal events in the evolution of the lithium industry.

Supply or offtake deals have been struck between lithium producers/developers and auto groups previously.

But in industry firsts, Liontown (ASX:LTR) and Vulcan Energy ASX:(VUL) have attracted financial support for their lithium projects, in addition to offtake arrangements.

Liontown secured a $300 million debt facility from Ford to be used for the development of its Kathleen Valley project in Western Australia while Stellantis took up an 8% stake in Vulcan for $76 million in support of its lithium/geothermal project in Germany.

The financial support for the new lithium projects highlights the growing concerns auto groups have about being able to secure the raw materials for the lithium-ion batteries that underpin the electric vehicle megatrend.

Canaccord analyst Reg Spencer said the Liontown and Vulcan deals were the first instance of Western world auto companies committing to more than just offtake arrangements to secure future lithium supplies.

"In our view this is a recognition by industry of the potential for long-term supply shortfalls in the lithium market and reflects growing competition for security of supply," Spencer said.

He said the two deals could mark the beginning of more activity by auto groups in the upstream or mining side of lithium supply. It is something leading lithium industry consultant Benchmark Mineral Intelligence has long considered a necessity.

"For the next decade, physical supply of key battery raw materials is king – it will make or break automakers' trillion dollar EV plans," Benchmark CEO Simon Moores said in June.

"If you do not physically own the raw material mine level assets, you simply will not have complete control over your EV destiny for at least the next 10 years."

Benchmark estimates that lithium-ion battery demand is growing at its fastest rate and is on course for 50% year-on-year growth.

The growth in demand is underpinning continued out-performance by lithium prices. Lithium carbonate and hydroxide prices have stabilised at or near all-time records in recent weeks of $US70,000/t and $US71,000 respectively.

Despite the industry-shaping Liontown and Vulcan deals, and lithium's continuing price strength, lithium stocks did not escape the share market meltdown in June.

In fact, they were hit harder because the market sell-off followed on from a controversial call in late May by Goldman Sachs that the lithium boom was over.

Somewhat ironically, the investment bank's call that lithium prices would crash to $US16,000 a tonne in 2023 was not based on a global economic slowdown or falling demand for lithium.

It also agrees lithium will continue to enjoy exponential demand growth as the EV revolution gathers pace.

However it forecasts that lithium supply will soon move into over-supply because of the "outsized supply response" triggered by the at or near record price levels for the key battery material.

But leading producers dismiss the assessment. US lithium heavyweight Albemarle told a battery materials conference in Arizona earlier this month that to keep up with demand, every existing producer would have to double every two to three years for the next decade.

> "For the next decade, physical supply of key battery raw materials is king – it will make or break automakers' trillion dollar EV plans"

MARKET INSIGHTS

Time to power up

As the EV push gains pace amid miner production shortfalls, the battery metals sector is in need of a jump-start.


Guy Le Page

GUY LE PAGE

"Many established car manufacturers such as General Motors are also looking to phase out petrol/diesel by 2035"

Battery metals – principally lithium, graphite, cobalt, and nickel – can all be expected to attract increases in demand owing to the electrification of global transport with battery electric vehicles (BEV) projected to reach 50% of all vehicles by 2035 (Figure 1).

Many established car manufacturers such as General Motors are also looking to phase out petrol/diesel by 2035.

A typical lithium-ion battery (NMC532) contains approximately 8kg of lithium, 35kg of nickel, 20kg of manganese and 14kg of cobalt, however amounts of these inputs vary significantly.

The good news for motorists is that batteries are now 30 times cheaper and more portable than their predecessors in the 1990s with Bloomberg NEF projecting that lithium-ion EV batteries should drop below US$100 per kilowatt-hour by next year which could see price parity by the mid-2020s.

While lithium and graphite are abundant in the Earth's crust, sourcing nickel and cobalt even before the trend towards electrification was challenging to say the least, with a heavy reliance, in the case of nickel, on direct shipping laterite ore from Indonesia, The Philippines and New Caledonia together with expensive High Pressure Acid Leach plants processing nickel laterite ores. Cobalt sources outside of the DRC (who don't meet the West's ESG standards) are even harder to come by and mostly a byproduct of nickel sulphide/nickel laterite mining. Graphite production is currently dominated by China, but the growth in demand will likely require filling from East African deposits.

Not surprisingly manufacturers are looking to cut down on the intensity of use of these inputs by improving battery recycling; a significant challenge.

Lithium has taken most of the limelight over the last few years. Lithium equities (Figure 2) began with a market capitalisation base of $1 billion in 2015 (Argonaut, 2022), then rose sharply resulting in an outsized Western Australian spodumene supply response. This resulted in lithium carbonate prices falling below US$10,000/t, representing a critical incentive price for the industry.

Cumulative market capitalisation in the lithium industry exceeded $36 billion in early 2022, as demand growth accelerated. The majors made their first forays with Rio Tinto (ASX:RIO) investing in the Jadar Project in Serbia and recently acquiring the Rincon project in Argentina.

The question then is: is the market accurately assessing the likely lithium demand-supply balance in the coming years, and if so, are equities appropriately valued?

Goldman Sachs (May 2022) considers the battery metals bull market is over on the basis that the supply response will deliver a near term surplus. However, unlike in 2017-18, a couple of low technical and jurisdiction-risk Australian hard-rock assets will not be sufficient to meet growth in demand.

Some of the recent market darlings have drawn skepticism from short-sellers who have questioned many developers' production forecasts. These include J Capital on Vulcan Energy (ASX:VUL) and Lake Resources (ASX:LKE), and Hindenburg Research on Standard Lithium (CVE:SLI). Jurisdiction risk has also reared its ugly head with Rio Tinto's Jadar Project and AVZ Minerals' (ASX:AVZ) Manono Project.

It appears the unstoppable EV momentum is upon us and is likely to continue to drive battery metal prices higher for the medium term at least as many miners fail to meet their production forecasts.

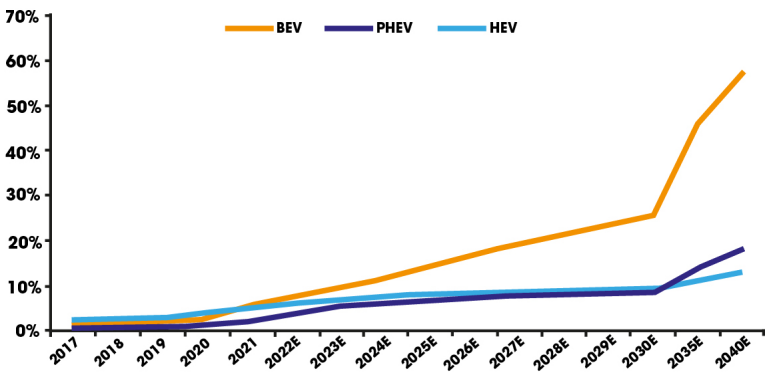


Figure 1: Global electric vehicle projections. (Source: LMC automotive, Autodata, CAAM, EAFO, Macquarie Research, July 2022)

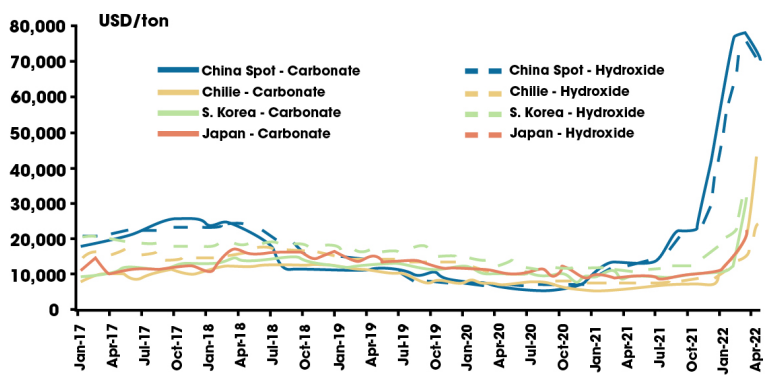


Figure 2: Lithium prices. (Source: Morgan Stanley, June 2022.)

MARKET INSIGHTS

Is it time to call the doctor for copper stocks?

Where next for the red metal after its recent falls?

JOSH CHIAT

Known as Dr Copper because its price is viewed as a diagnosis of the state of the world economy, you're forgiven for thinking we may all be boned.

The red metal is yet to return to peak performance since hitting an all time high of US$10,700/t in May last year.

On July 6 it fell to a 20-month low of US$7520.50/t, something that has doomsdayers sounding the bells of recession.

Yet mining experts say the current bearish mood could be clouding a rich future for copper as it transitions into its status as a future facing battery metal.

Why is copper a battery metal?

Copper may not have the same clout as lithium right now, but demand should explode as electric vehicle use accelerates.

Its use in wiring and motors mean there are 83 kegs of copper in a battery powered car, compared to just 23 in an ICE vehicle.

Add the growth of renewable energy and transmission infrastructure, and our future copper needs are mind-boggling.

The ICSG expects copper surpluses of 142,000t in 2022 and 352,000t in 2023. Don't expect that situation to last.

Minelife senior resource analyst Gavin Wendt says demand for the metal could grow 10-15 times within the next 15 years.

"God knows how we're going to mine 10 times more copper. It sounds almost physically impossible," he said.

Wendt says negative sentiment is masking major supply issues for copper, including production problems for leading producers in Chile and Peru and barren warehouse stocks.

Stocks to play copper Fundamentals

Wendt has two stocks in particular he likes right now.

Recently listed producer Austral Resources (ASX:ARI) (market cap $110m) is ramping up to 10,000t of LME grade copper cathode a year from the Lady Annie mine near Mt Isa and has a supply deal with Glencore.

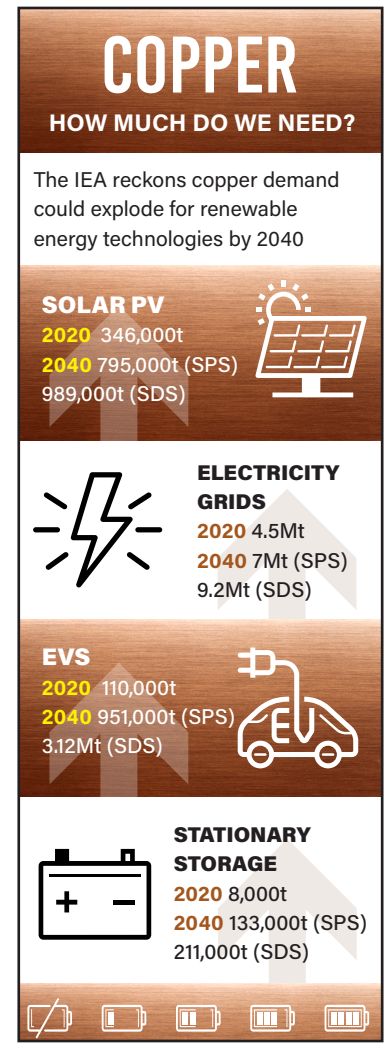
"The fact that they are domestically based in Queensland, they have low geopolitical risks compared to a lot of other copper producers in the world, which generally tend to go where the metal is, places like Africa where risks are significantly higher," Wendt said.

Copper concentrate

For an exploration play he likes Ecuador-focused Sunstone Metals (ASX:STM) (market cap $125m).

"Malcolm Norris, who runs Sunstone, has a tremendous track record in terms of copper exploration," Wendt said.

"He has been involved with two major copper porphyry discoveries before his time with Sunstone and now he's trying to duplicate that success."



"Experts say the current bearish mood could be clouding a rich future for copper as it transitions into its status as a future facing battery metal"


Bags of lithium


Car batteries

"Demand for lithium ... is continuing to accelerate at a speed faster than what most people would have expected"

MARKET INSIGHTS

Missed the boom?

Here are four stocks to help you catch the second lithium wave

JESSICA CUMMINS

ASX lithium stocks have declined 27% on a market cap weighted basis over the past three months.

Companies already in production like Mineral Resources (ASX:MIN), Allkem (ASX:AKE), and Pilbara Minerals (ASX:PLS) are down some 20–25% while developers such as Lake Resources (ASX:LKE) have dropped as much as 65%.

But as Seneca Financial Solutions CEO and investment advisor Luke Laretive points out, lithium and spodumene prices have continued to march higher and most analysts agree – long-term price forecasts between US$10-$20,000/t will likely remain in the near term.

This is because the demand for lithium, which is driven by the demand for electric vehicles, is continuing to accelerate at a speed faster than what most people would have expected.

Laretive says this speed, coupled with the inherent challenges of developing a mine, is likely to result in a protracted period of extraordinary prices until at least 2030.

OUR TOP PICKS

Of the producers, Laretive says **Mineral Resources (ASX:MIN)** is one of his favourites.

"I see the potential spin-out value of the lithium assets as undervalued and underappreciated while coupled with the company's iron-ore operations," he says.

"Of the pure-play producers, I like **Pilbara Minerals (ASX:PLS)** as there is significant potential takeover value and an undemanding valuation at current prices."

When it comes to developers, Laretive says Seneca Financial Solutions screens out names that are proposing to operate in challenging jurisdictions and others on valuation grounds.

"There are some insanely overhyped, low-quality projects listed on the ASX," he says.

It all comes down to well-capitalised companies through key share price catalysts and where management have been able to meet or exceed milestones.

"Our preference remains **Vulcan Energy Resources (ASX:VUL)** – it is a large, expanding resource that will operate at exceptional margins once in production and is strategically located in Germany where most of the European giga-factories are located," he says.

"It is also trading at a significant discount to peers on an EV/Resource basis.

"Seneca also sees value in Australian-focused **Liontown Resources (ASX:LTR)** – they are well funded and have been able to secure project finance and offtake with Ford Motor Company taking them through final investment decision (FID) recently."

And lastly, Laretive says **Piedmont Lithium (ASX:PLL)** is on his watchlist.

"The CFO Michael White just bought US$101,221 worth of stock.

"I can see why – the company is fairly discounted relative to peers at c. $0.53 and they also have the potential to supply low cost/high margin feedstock for US-based giga-factories who are expected to require c. 500,000/t per annum of lithium hydroxide from 2025."

FEATURED COMPANIES

As the pursuit of clean energy becomes a global imperative, investors who educate themselves about the battery metals sector stand to make substantial gains. **Meet the companies at the forefront of the field.**

11 Alma Metals (ALM)
12 Alpha HPA (A4N)
13 Alvo Minerals (ALV)
14 Anax Metals (ANX)
15 Arizona Lithium (AZL)
16 Australian Vanadium (AVL)
17 Azure Minerals (AZS)
18 Black Canyon (BCA)
19 Black Rock Mining (BKT)
20 Cannon Resources (CNR)
21 Cazaly Resources (CAZ)
22 Cobalt Blue Holdings (COB)
23 Conico (CNJ)
24 Eagle Mountain Mining (EM2)
25 European Lithium (EUR)
26 Evolution Energy Minerals (EV1)
27 Firetail Resources (FTL)
28 FYI Resources (FYI)
29 Global Lithium (GL1)
30 Golden State Mining (GSM)
31 Infinity Lithium (INF)
32 International Graphite (IG6)
33 Latin Resources (LRS)
34 Lunnon Metals (LM8)
35 NickelSearch (NIS)
36 Norwest Minerals (NWM)
37 Panther Metals (PNT)
38 QEM limited (QEM)
39 Ragnar Metals (RAG)
40 Sovereign Metals (SVM)
41 Technology Metals Australia (TMT)
42 Venture Minerals (VMS)
43 Vulcan Energy Resources (VUL)

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**Figures for Market Cap and Share Price were sourced from asx.com.au*

DR FRAZER TABEART
MANAGING DIRECTOR

ALMA METALS

(ASX:ALM)

- **Company Name:** Alma Metals
- **Company ASX code:** ALM
- **Key commodities:** Copper and gold
- **Key Personnel:** Mr Alasdair Cooke, Executive Chairman | Dr Frazer Tabeart, Managing Director | Mr Dan Davis, CFO
- **Locations:** Queensland, Western Australia
- **Market Cap as of 15/07/22:** $8.13M
- **Share price range over 12 months as of 15/07/22:** $0.053 - $0.010
- **Company Website:** almametals.com.au

COMPANY PROFILE

Alma Metals is an Australian minerals exploration company with three exploration projects currently on the go, hunting for copper and gold – one in Queensland and the others in Western Australia.

The company's Queensland operation, and its apparent main focus at present, is its Briggs, Mannersley and Fig Tree Hill Porphyry Copper Joint Venture, made up of three exploration permits covering a total area of 241km^2.

The project contains a JORC compliant Inferred Resource estimate of 143Mt @ 0.29% copper at a 0.2% copper cut-off grade in the Briggs Central Porphyry.

Recent exploration results were highly positive, with porphyry mineralisation now logged in nearly every hole along a strike length of more than 1,500m below a surface geochemical anomaly which is over 2,000m long and more than 750m wide.

Soil sampling on this project is the first modern program to collect high resolution, low detection level gold and multi-element geochemistry across the entire Briggs porphyry system, and was performed as part of Alma's exploration commitment under its earn-in joint venture deal with Canterbury Resources (ASX:CBY), under which ALM can earn up to 70%.

In April, metallurgical test work from Briggs returned copper recoveries of between 92% to 95%, producing concentrates with grades ranging from 17% to 20%. The company notes that there's significant potential to improve the results through optimisation, including evaluating the grind size, selective collector use and pyrite suppression.

Analysis of all exploration data has allowed Alma to report an exploration target of 450Mt to 850Mt of copper mineralisation ranging from 0.20% Cu to 0.35% Cu, and the Company expects to resume drilling shortly.

Meanwhile, in Western Australia, Alma has identified a first mover opportunity for copper mineralisation in the East Kimberley. The Company has applied for five maximum size exploration licences encapsulating multiple copper occurrences in ancient sedimentary layers, and is currently negotiating an exploration agreement with the traditional owners and native title holders. On-ground work is expected to commence later in the year.

Alma is also exploring its South West Terrane project in WA, where licences have been granted across three areas considered prospective for large porphyry copper-gold deposits and/or intrusion related orogenic gold deposits. Alma believes that the projects may be spatially related to nearby large-scale porphyry deposits such as Boddington and Caravel.

Alma says project areas are also considered prospective for intrusion related orogenic gold mineralisation.

The leadership group at Alma Metals is a who's who of resource exploration, with Dr Frazer Tabeart in the captain's seat as Managing Director. Tabeart is an industry veteran with more than 30 years experience in the international resources industry in both exploration and mining projects covering copper, gold, coal, uranium and nickel across five continents.

The other key executive is Alisdair Cooke who has over 27 years' experience in the resource exploration and mining industry throughout Australia and internationally, initially as part of BHP Minerals Business Development Group.

Cooke has spent the past 20 years managing public resource companies as part of the Mitchell River Group, which oversees a strong list of mining operations and resource companies, including African Energy Resources, Exco Resources, Albidon, Panoramic Resources, Caravel Minerals and Mirabella Nickel.

ALMA METALS

KEY INVESTMENT HIGHLIGHTS

APRIL 11, 2022: Excellent Metallurgical characteristics confirmed At Briggs copper deposit.

MAY 12, 2022: Soil sampling confirms potential for larger mineralised system at Briggs.

JULY 4, 2022: Alma commits to the Briggs Joint Venture.

RIMAS KAIRAITIS
MANAGING DIRECTOR

ALPHA HPA

(ASX:A4N)

- **Company Name:** Alpha HPA
- **Company ASX code:** A4N
- **Key commodities:** High purity alumina (Alpha and Gamma), boehmite, aluminium nitrate and aluminium sulfate
- **Key Personnel:** Norm Seckold, Executive Chairman | Rimas Kairaitis, Managing Director | Rob Williamson, Chief Operating Officer
- **Locations:** Demonstration Plant - operating (Brisbane), Precursor Production Facility – under construction (Gladstone), Full-scale commercial facility – subject to FID (Gladstone)
- **Market Cap as of 15/07/22:** $330.12M
- **Share price range over 12 months as of 15/07/22:** $0.700 - $0.380
- **Company Website:** alphahpa.com.au

COMPANY PROFILE

Queensland's Alpha HPA is a technology company that is sharply focused on its industrial chemical strengths, which it is leveraging in a big way while seeking to commercialise a world-first process to produce ultra-high purity aluminium oxides, nitrates and sulphates for the burgeoning LED lighting and Li-ion battery markets.

Operating across three individual sites – one in Brisbane and two in Gladstone – one of the critical differences Alpha HPA sees in itself that sets it apart is that it is on a quest to not only supply the market with high quality product, but also to do so as cleanly and ethically as possible by utilising green energy sources

To achieve those goals, Alpha HPA has developed and is now commercialising a world-first process to deliver these critical materials at market-leading purity levels and at a dramatically lower carbon profile.

The company says its licenced Smart SX process, which is the world's first adoption of the solvent extraction (SX) purification technique to aluminium, which it has perfected through over 7,000 hours of operation at demonstration scale and established a global product marketing network with over 40 end users.

Alpha is now rapidly scaling to commercial operations with the Stage 1 Precursor Production Facility (PPF), due to commence production in the September quarter of 2022.

Construction is underway on its production facilities in the Tier-1 jurisdiction of Gladstone, QLD, which is strategically adjacent to the company's chemical counterparty, Orica Ltd.

Orica will supply the process reagents and offtake the process by-product, creating a 100% reagents recycle, and qualifying the site as a near-zero waste facility.

The Gladstone location also allows Alpha HPA to realise ready access to abundant aluminium feedstock from the local alumina refinery, as well as access to an established industrial-skilled workforce.

With the steady hand of Executive Chairman Norm Seckold on the tiller, the company has identified two key decarbonising technologies it believes are the ideal beneficiaries of its product:

LED lighting: The continued transition to high- efficiency LED lighting is expected to save a further 1.4Bn tonnes on CO2 emissions; and

E-mobility: The forecasted adoption of lithium-ion based e-mobility in transportation is set to reduce global transport CO2 emissions by over 50%.

Alongside Seckold are two well-respected industry voices, in Managing Director Rimas Kairaitis and Chief Operating Officer Rob Williamson, whose experience has helped guide the company to its current, high-potential phase.

The short-term plan for the company is to get its two main products into the hands of industry, through the manufacture and sale of its 5N Ultra Aluminium Precursor salts, Ultra aluminium nitrate (99.999% purity) – used for various speciality applications including coatings, LED and laser phosphors, lithium-ion battery electrode coatings and scintillators, and Ultra aluminium sulphate (99.999% purity), used predominantly for the synthesis of aluminium-bearing lithium-ion battery cathode active materials (e.g. NCA and NCMA).

The Stage 1 PPF facility has been designed to have a total ultra aluminium precursor production capacity of ~10-20MT per month, with construction taking place on the same site as the HPA First Project in Gladstone.

Once customer product requirements are finalised, Alpha HPA will then proceed to the full-scale construction of the project in Gladstone, scaling up to the equivalent of ~10,000tpa of high purity alumina, making the project the largest single source of high purity aluminium products globally.

Alpha **HPA**

KEY INVESTMENT HIGHLIGHTS

JUNE 23, 2022: Alpha HPA Stage 1 on track for Sep/Oct 22 start-up.
MARCH 16, 2022: Alpha HPA First Project awarded $45m federal government grant for Stage 2.
APRIL 28, 2022: Alpha HPA Awarded up to $15m in federal government funding for Stage 1 expansion

ROB SMAKMAN
MANAGING DIRECTOR

ALVO MINERALS

(ASX:ALV)

- **Company Name:** Alvo Minerals
- **Company ASX code:** ALV

Key commodities: Copper and zinc

- **Key Personnel:** Rob Smakman, Managing Director | Graeme Slattery, Non-Executive Chairman | Beau Nicholls, Non-Executive Director
- **Locations:** Palmeiropolis region of central Brazil
- **Market Cap as of 15/07/22:** $16.02M
- **Share price range over 12 months as of 15/07/22:** $0.41 / $0.22
- **Company Website:** alvo.com.au

COMPANY PROFILE

Base and precious metals explorer Alvo Minerals is dedicated to hunting high-grade copper and zinc at its flagship Palma Project, located in the under-explored Palmeiropolis region of central Brazil.

Alvo launched its operation there in 2018, after the Brazilian Federal Geological Survey department announced a public auction for their Palmeiropolis Volcanogenic Hosted Massive Sulphide (VMS) Project gave the company an early opportunity to recognise that location's potential and jump in.

Since then, the company has been "aggressively exploring and delivering growth through discovery", leaning heavily on its management team's extensive track record in Brazil.

Among those at the helm at Alvo is Managing Director and veteran geologist Rob Smakman, who has been in the business for more than two decades, many of those years spent in South America.

Smakman founded and listed Crusader Resources and was responsible for instigating its Brazilian entry and operations, before turning his vast experience (and fluency in Portuguese) towards Alvo – a company name derived from the Portuguese word for "target".

He has also sourced, negotiated, explored and built projects in Brazil – and elsewhere around the world – and has raised more than US$100 million in capital (equity and debt) for multiple projects over the years.

Working alongside Smakman is Non Executive Chairman and Director Graeme Slattery, a practising corporate lawyer with over 20 years of experience advising companies in the mining and resources sector.

Beau Nicholls, is a Geologist with over 25 years international experience, including 9 years in Brazil as the Principal consultant for leading international consulting firm Coffey Mining, is also part of the Alvo management structure in a Non Executive Director role.

The company's philosophy is both defined by, and informs, the approach it takes: Discover, Expand, Upgrade, with each phase put into action in the following manner.

1. Upgrade: involves infill drilling around the known resources at 'CI' and 'C3' to increase the confidence of these resources.
2. Expand: focuses on the known mineralised zones at 'CI', 'C3' and 'C4' to increase the overall size of the mineralisation.
3. Discover: exploration and drilling drilling on new and promising prospects – aiming for new discoveries.

It's a modus operandum that has turned out some very promising results so far, including a JORC 2012 Inferred Mineral Resource Estimate – 4.6Mt @ 1.0% Cu, 3.9% Zn, 0.4% Pb & 20g/t Ag at Palma.

The flagship Palma Project comprises approximately 500km2 of granted exploration licences and applications, including 30km of strike of the prospective VMS geological lithologies.

The Palma Project's key tenements were the subject of extensive historical work that was completed in the 1970s and 1980s, which led to the identification of advanced targets of VMS mineralisation

Alvo has been drilling since listing-initially focussing on the Upgrade and Expand part of their strategy and has successfully confirmed the historical work.

The company is now extending the drill program to focus around Discovery- combining a new geological understanding with cutting edge geophysical technology to target their drilling.

Considering that VMS mineralisation often occurs in clusters, Palma represents an outstanding opportunity for Alvo to explore a district scale project.

ALVO MINERALS

KEY INVESTMENT HIGHLIGHTS

JUNE 17, 2022: Multiple thick, high-grade polymetallic intersections up to 1.86% copper, 8.68% zinc, 1.91% lead at Palma.
FEBRUARY 14, 2022: Alvo maiden drill program at Palma Project returns 15m at 3.32% copper, 8.06% zinc, 0.34% lead, 31 g/t silver and 0.12 g/t gold from 258.85m.
OCTOBER 31, 2021: Barry Fitzgerald names Alvo as a company to watch after a solid IPO.

GEOFF LAING
MANAGING DIRECTOR

ANAX METALS

(ASX:ANX)

- **Company Name:** Anax Metals
- **Company ASX code:** ANX
- **Key commodities:** Copper, gold, zinc, lead and silver
- **Key Personnel:** Geoff Laing, Managing Director | Phillip Jackson, Non-Executive Chairman | Wendy Beets, Project Generation Manager
- **Locations:** Whim Creek in the Pilbara region, Western Australia
- **Market Cap as of 15/07/22:** $30.82M
- **Share price range over 12 months as of 15/07/22:** $0.125 - $0.069
- **Company Website:** anaxmetals.com.au

COMPANY PROFILE

Based in Western Australia, Anax Metals is on a mission to revitalise an iconic Pilbara mining asset at Whim Creek, while also employing cutting edge technical innovations to bring a new approach to finding and developing resources assets.

Anax's Pilbara projects are focussed on the mineralisation that the area is world-famous for: copper, gold, zinc, lead and silver.

The most advanced of these is its Whim Creek Copper-Zinc Project, located approximately 120km south-west of Port Hedland, where Anax has entered into an earn-in agreement with Develop Global Limited to advance the project towards production.

The project tenure consists of a raft of elements, including seven mining leases, two exploration licences and one "miscellaneous licence", covering a combined 175km2 area.

Whim Creek has a defined JORC 2012 Resources of +10 Million tonnes of which 3.8 million tonnes have been scheduled for Production at an average grade of 1.33% Cu and 2.7% Zn.

Anax's activities at Whim Creek have continued to enhance the project, with feasibility test work confirming that the ore is well suited to the application of smart ore sorting technology.

Additionally, there is significant near-mine exploration potential, building on the current resource inventory.

The Whim Creek Project is expected to produce circa 10-14ktpa of Cu equivalent in concentrates and has attracted the attention of Anglo American Ltd who have offered debt financing subject to the outcomes of the Definitive Feasibility Study.

The company is also currently pursuing exploration efforts at the Loudens Patch tenement, which has had limited previous exploration despite sharing similar geology with some well mineralised neighbours.

Outside of Anax's opportunties in the Pilbara, the company is also working up the Mount Short tenement, which covers a 50km2 area of the Ravensthorpe Greenstone Belt, and is prospective for volcanogenic massive sulphides (VMS), nickel massive sulphides and structurally controlled gold mineralisation.

Anax says that Mount Short has had some historical exploration done, with a total of 246 holes drilled, mostly shallow aircore and rotary air core, prior to exploration work conducted by Traka Resources between 2005 an 2017.

It's in that latter exploration area that Anax is set to focus its efforts in the near-term, following a review of other data collected by Traka to determine whether coincident magnetic and electromagnetic anomalies have been investigated thoroughly enough.

As a company with innovation embedded in its operational culture, Anax is always open to new projects that provide a cost effective, leveraged entry to development assets.

Near term production opportunities, with a focus on gold and base metals, especially those that feature massive sulphide mineralogy are being considered, as are opportunities with a focus on gold and base metals, especially any that feature massive sulphides mineralogy.

Anax is led by a team of highly-experienced professionals, including managing director Geoff Laing; a Chemical Engineer with over 25 years' experience in project funding and mine development across a variety of commodities, in Australia, Africa, Europe and South America.

Alongside Laing, Non-Executive Chairman and corporate lawyer Philip Jackson brings decades of experience in the mining sector to the table, which includes a stint with Western Mining Corporation, where Jackson was instrumental in exploration and development of resources.

ANAX
METALS LIMITED

KEY INVESTMENT HIGHLIGHTS

JULY 11, 2022: High-Grade gold in rock chips at 'Hemi-style' Whim Creek Prospect.
JUNE 2, 2022: Outstanding assay results confirm massive sulphide intersections at Whim Creek.
APRIL 12, 2022: Spectacular massive sulphides intersected at Whim Creek.

PAUL LLOYD
MANAGING DIRECTOR

ARIZONA LITHIUM

(ASX:AZL)

- **Company Name:** Arizona Lithium
- **Company ASX code:** AZL
- **Key commodities:** Lithium
- **Key Personnel:** Paul Lloyd, Managing Director| Matthew Blumberg, US-based Executive Director | Brett Rabe, Chief Technical Officer
- **Locations:** Arizona & New Mexico, USA
- **Market Cap as of 15/07/22:** $189.84M
- **Share price range over 12 months as of 15/07/22:** $0.240 - $0.028
- **Company Website:** arizonalithium.com

COMPANY PROFILE

By 2050 over 50 million auto sales a year will be electric vehicles, a mind-boggling increase from just 6.5 million in 2021.

With current mining practices, producing those vehicles could generate some 1Bt of CO2, equivalent to the annual emissions of the UK, France and Italy combined.

US-focused Arizona Lithium is proposing another way to service a market that from 2027 on Macquarie analysts expect to be in perpetual deficit, with demand more than offsetting new sources of supply.

The Company own Big Sandy deposit in the western US state of Arizona, just one state over from the Tesla Gigafactory, with the project holding a 32.5Mt resource of sedimentary lithium which at a grade of 1850ppm Li contains an estimated 320,800t of lithium carbonate equivalent.

Arizona would be one of the first commercial proponents of a sedimentary hosted lithium project.

The style of mineralisation is amenable to shallow, low cost mining with minimal requirement for crushing and grinding.

AZL says sedimentary deposits carry an estimated Li2CO3 production cost of US$4000/t compared to US$2500-4000 for brine and US$6000/t for Australian style hard rock mines.

Extreme tightness in lithium supply for EVs has seen lithium carbonate prices rise more than 350% this year to ~$75,000/t.

The Resource covers just 4% of the Big Sandy project area, and beyond the current indicated and inferred JORC resource is an exploration target of between 271.1Mt to 483.15Mt at 1000-2000ppm Li, making Big Sandy live up to its name.

A scoping study on the Big Sandy deposit is due shortly, and testwork in Hazen's labs already shows ore from the deposit can be processed into a 99.8% pure battery grade lithium carbonate.

The work has validated the design basis and flowsheet for Big Sandy, which is extremely critical given the deposit's novel nature.

With ESG a growing focus in the mining and particularly lithium industry, AZL has taken early steps to secure its status as a net zero emissions, net zero water producer.

Significantly, in March the company signed an MoU with Nikola Motors to study the use of its Nikola Tre trucks to replace conventional diesel trucks at Big Sandy.

One Nikola BEV will be in operation at Big Sandy during the research facility phase, with AZL anticipating it may need between 50-100 during operations in its efforts to maintain a low environmental footprint.

To build on the testwork at Hazen research, AZL is building a world class lithium research centre on a 9700sqm property in Tempe, Arizona, about 15km southwest of Phoenix, which is expected to operational before the end of the year.

The company expects to attract some of the world's best talent to research processing pathways to extract lithium from various ores and brines as well as the production of battery-grade lithium chemicals for current and future battery technologies.

Big Sandy is not the only ace up Arizona Lithium's sleeve. The company also boasts the 25km2 Lordsburg brine project in New Mexico where it has a first mover on a playa lake system with similarities to the geology of Clayton Valley, Nevada, currently the only lithium producing region in the States.

ARIZONA LITHIUM

KEY INVESTMENT HIGHLIGHTS

JUNE 20, 2022: Arizona signs 5 year lease to establish world class lithium research centre in Tempe, Arizona, near major battery players like Kore Power and LG.

JUNE 14, 2022: AZL Completes Hazen Research Bench-Scale Test Program, validating the Big Sandy design basis and flowsheet.

SEPTEMBER 26, 2019: AZL announces 320,800t LCE resource at flagship Big Sandy project.

VINCENT ALGAR
MANAGING DIRECTOR

AUSTRALIAN VANADIUM

(ASX:AVL)

- **Company Name:** Australian Vanadium
- **Company ASX code:** AVL
- **Key commodities:** Vanadium
- **Key Personnel:** Vincent Algar, Managing Director
- **Locations:** Western Australia
- **Market Cap as of 15/07/22:** $149.75M
- **Share price range over 12 months as of 15/07/22:** $0.105 - $0.018
- **Company Website:** australianvanadium.com.au

COMPANY PROFILE

Hailing from Western Australia, Australian Vanadium Limited (ASX:AVL) is a resource company focused on vanadium, seeking to offer investors a unique exposure to all aspects of the vanadium value chain, from resource all the way through to steel and energy storage opportunities.

AVL is advancing the development of its world-class Australian Vanadium Project at Gabanintha, near Meekatharra in the desert of Western Australia, close by a number of other mineral explorers taking advantage of the region's rich deposits.

The Australian Vanadium Project is currently one of the most advanced vanadium projects being developed globally, with 239Mt at 0.73% vanadium pentoxide (V_2O_5), containing a high-grade zone of 95.6Mt at 1.07% V2O5.

VSUN Energy is AVL's 100% owned renewable energy and energy storage subsidiary which is focused on developing the Australian market for vanadium redox flow batteries (VRFBs) for long duration energy storage.

Set up in 2016, VSUN Energy has rapidly made a name for itself on the world stage through its work and expertise with VRFBs – and together with AVL, it provides the group with a vertical integration strategy.

That sees AVL processing vanadium to high purity, manufacturing vanadium electrolyte and then working with VSUN Energy as it develops projects based on renewable energy generation and VRFB energy storage.

In addition to the $49 million grant awarded in March 2022, in July 2021 AVL was awarded a $3.69 million Federal Government manufacturing grant under the Modern Manufacturing Initiative Resources Technology and Critical Minerals Processing National Manufacturing Priority roadmap.

Part of the matched funding is allocated to development of a standalone power system (SPS) that will be installed at the Nova Nickel Operation belonging to IGO Limited (ASX:IGO) in 2022, where the system will supply power independent to the electricity grid. SPS typically comprise a combination of solar, wind and battery, with backup generation from diesel or gas if needed.

The remainder of the grant will be used to finalise the high purity processing circuit for the Australian Vanadium Project, build and operate a commercial vanadium electrolyte manufacturing plant producing 33MWh per annum and manufacture a prototype of a residential VRFB.

The SPS project with IGO marks an exciting time for AVL, according to company Managing Director Vincent Algar, and for the entire industry in general as it forges towards its decarbonisation goals.

"The installation of an SPS based on vanadium technology for pumping applications enables diesel to be almost entirely eliminated, helping reduce overall carbon emissions and providing reliable green power," Algar said recently.

There are several key reasons why AVL is getting right behind its VRFB tech, including its inherent safety, high cycle life of the unit and its sustainable nature.

Additionally, AVL's tech is tolerant of high heat conditions, such as the fearsome WA desert, while the flexibility will see it deployed across a wide range of applications in the years ahead.

Algar's pedigree in the mining industry stands him in good stead to lead AVL. With over 25 years' experience in the mining industry, he also has significant experience in the management of publicly listed companies.

Technical Director Daniel Harris and Chief Operating Officer Todd Richardson also bring decades of experience to the table, with both men boasting direct experience with vanadium in Australia and overseas.

Australian VANADIUM LIMITED

KEY INVESTMENT HIGHLIGHTS

APRIL 6, 2022: Bankable Feasibility Study sees pre-tax $NPV_{7.5}$ of A$833M and equity IRR 20.6%.

MARCH 16, 2022: Awarded $49 Million Australian Government Grant.

NOVEMBER 1, 2021: Total Mineral Resource updated to 239Mt at 0.73% V_2O_5.

TONY ROVIRA
MANAGING DIRECTOR

AZURE MINERALS

(ASX:AZS)

- **Company Name:** Azure Minerals
- **Company ASX code:** AZS
- **Key commodities:** Nickel, copper and cobalt
- **Key Personnel:** Tony Rovira, Managing Director | James Dornan, Project Development Manager | Graham Leaver, Exploration Manager
- **Locations:** Andover Project – Roeburne, West Pilbara
- **Market Cap as of 15/07/22:** $65.25M
- **Share price range over 12 months as of 15/07/22:** $0.470 - $0.180
- **Company Website:** azureminerals.com.au

COMPANY PROFILE

Azure Minerals made a name for itself back in October 2020 when it hit paydirt in its first drillhole at the nickel-rich Andover Project in Western Australia's Pilbara region.

The hit – 4m of massive nickel copper sulphide mineralisation at a depth of 94.5m, within a broader 40.7m zone of nickel copper bearing mineralisation, sent shares in the small cap flying some 50pc at the time.

Up until then, the company was predominantly focused on its Mexican assets, including the Alacrán silver-gold-copper and Oposura zinc-lead-silver projects.

That all changed after COVID-19, when managing director Tony Rovira decided to switch course and take the company in a new direction due to how badly the pandemic affected the Latin American country.

After reaching out to the legendary prospector Mark Creasy, well regarded for his discoveries of the Bronzewing and Jundee gold mines, as well as the Nova nickel mine, Azure acquired and added a total of four new projects to its portfolio.

These included Andover and the Turner River, Meentheena and Coongan Gold Projects.

The move was a game changer for Azure, and although Creasy had been a shareholder in the company since its IPO in 2003, the deal made him one of its two biggest shareholders.

The Andover project, which is a joint venture between Azure (60%) and the Creasy Group (40%) is now the company's flagship project and it is where exploration works have been aggressively progressing ever since its acquisition.

Only some 3.5km from Artemis Resources' Carlow Castle gold-copper-cobalt deposit, the project comprises a maiden mineral resource estimate of 4.6Mt at 1.11% nickel, 0.47% copper and 0.05% cobalt for 75,000t of combined contained metal.

While the resource estimate marked a key milestone in advancing the project and the beginning of a very exciting journey, exploration works including geological mapping, surface geochemical sampling and diamond drilling have identified other key targets along a 4km long fairway called the Southern Mineralised Corridor (SMC).

As well as hosting the Andover deposit, it also hosts the Ridgeline nickel-copper-cobalt deposit where mineral resource drilling is underway, and the Skyline and Seaview prospects in the east.

Currently, the SMC between Ridgeline and Seaview forms the highest priority horizon for exploration within the Andover complex, and Azure currently has two rigs drilling at Ridgeline and the Atrium prospect.

Down hole electromagnetic (DHEM) surveys will be undertaken in the recent Ridgeline drill holes, which will be followed by surveying of the holes at both Skyline and Atrium.

The company's Barton Gold Project in WA's Kookynie gold district is another exciting play.

Multiple drill holes have recently intersected gold mineralisation at Daisy Corner, which extends for 800m along strike to the northwest of Genesis Minerals' Puzzle and Puzzle North gold deposits.

Follow-up work such as geological mapping and soil sampling is underway to assist in the next phase of drilling.

At the end of May, the company reached a binding agreement to sell its Mexican projects to Bendito Resources to allow Azure to focus on developing its Andover project.

It is the intention of Bendito to list on the Toronto Stock Exchange within 18 months of completion of the transaction with the Alacrán, Oposura and Promontorio projects forming the core assets of Bendito.

AZURE MINERALS LIMITED

KEY INVESTMENT HIGHLIGHTS

MAY 30, 2022: Azure sells Mexican precious and base metal projects to Bendito Resources for A$20 million.

MARCH 30, 2022: A maiden resource estimate at the Andover deposit delivers 4.6Mt at 1.11% nickel, 0.47% copper and 0.05% cobalt for 75,000t of contained metal.

MARCH 16, 2022: Massive nickel sulphides up to 6.3m at 3.59% nickel, 0.21% copper and 0.17% cobalt from 459.2m are intersected at Ridgeline, forming part of the Andover Project.

BRENDAN CUMMINS
EXECUTIVE DIRECTOR

BLACK CANYON

(ASX:BCA)

- **Company Name:** Black Canyon
- **Company ASX code:** BCA
- **Key commodities:** Manganese
- **Key Personnel:** Brendan Cummins, Executive Director | Graham Ascough, Non-Executive Chairman
- **Locations:** Western Australia
- **Market Cap as of 15/07/22:** $10.34M
- **Share price range over 12 months as of 15/07/22:** $0.485 - $0.200
- **Company Website:** blackcanyon.com.au

COMPANY PROFILE

Around 90% of the manganese ore mined in locales like Australia and South Africa is traded in the steel market, where it removes oxygen and sulphur impurities in iron, and is used as an alloy that hardens and strengthens crude steel.

But it is also the M in the famous NCM (nickel, cobalt and manganese) cathode chemistry used in the lithium-ion batteries which power long range Tesla EVs.

Manganese is an under the radar but relatively abundant bulk commodity, and Elon Musk has noted the potential to increase the manganese content in NCM batteries given the rarity and high price of nickel and cobalt.

That is increasing the potential for new players to break into the emerging market for high purity manganese sulphate, almost all of which is currently processed in China.

One manganese explorer based in WA is already taking steps to move into the space.

Black Canyon only listed in May last year boasting five projects with major manganese bearing potential in the Pilbara, a region best known for its iron ore riches but also host to ConsMin's Woodie Woodie and Element 25's Butcherbird, two of a handful of operating manganese mines in Australia.

In under a year of exploration Black Canyon already boasts 104Mt at 10.5% manganese at its flagship Flanagan Bore project, part of the Carawine JV that Black Canyon holds on a 51% basis and is building to a 75% stake.

A higher grade portion of that resource comes in at 12.8% and initial testwork has already shown it could produce manganese with economic grades above 30% for silico or ferro manganese feedstock for the 2Btpa steel industry, where Black Canyon's main market will lie.

But initial acid leaching testwork is now under way on Black Canyon's manganese concentrates to see if it can be leached and then eventually converted into high purity manganese sulphate as a cathode precursor for NCM batteries.

"What we're seeing is that the manganese sulphate market for batteries is looking to increase approximately 10 times between now in 2022 and 2040," Black Canyon executive director Brendan Cummins said.

"In terms of the strategy that BCA is adopting, we could hopefully be in a position to set up a manganese sulphate plant using ores from Western Australia, from our own deposits and produce manganese sulphate here in WA."

Each NCM battery contains around 10-30% manganese, equating to 10-90kg depending on the cathode chemistry. EV sales doubled globally in 2021 and continue to accelerate.

Manganese is recognised as a critical mineral in Australia, the USA and Japan and according to Geoscience Australia, we produce around a quarter of the world's manganese ore.

But the supply chain for battery grade manganese is, like other aspects of the EV supply chain, heavily concentrated in China.

China produces about 90% of global manganese sulphate that feeds into NCM batteries, which actually makes perfect sense, that's where most of the EVs are made so they require locally sourced batteries" Cummins said.

"But I think over time, there'll be more of a push particularly from the US and Europe, they'll want to have their own electric vehicle car manufacturing industry, so they are going to want alternative sources for their manganese sulphate and NCM batteries."

BLACK CANYON

KEY INVESTMENT HIGHLIGHTS

JUNE 9, 2022: Test work successfully produces manganese concentrate above 30% and leaching tests on production of battery grade manganese sulphate begin.
APRIL 29, 2022: BCA raises $3.2 million at 33c a share to fund exploration and testwork while keeping tight capital structure.
APRIL 13, 2021: BCA announces 89Mt increase in Flanagan Bore resource to 104Mt at 10.5% Mn.

JOHN DE VRIES
MANAGING DIRECTOR

BLACK ROCK MINING

(ASX:BKT)

- **Company Name:** Black Rock Mining
- **Company ASX code:** BKT
- **Key commodities:** Graphite
- **Key Personnel:** John de Vries, Managing Director and CEO | Mr Alimiya (Ali) Osman, CEO Faru Graphite Corporation, Tanzania
- **Locations:** Tanzania
- **Market Cap as of 15/07/22:** $141.70M
- **Share price range over 12 months as of 15/07/22:** $0.315 - $0.135
- **Company Website:** blackrockmining.com.au

COMPANY PROFILE

Graphite often flies under the radar when discussing lithium-ion batteries, but an EV battery contains around 66kg of graphite – around 7 times the amount of lithium required – so it's playing a huge part in decarbonisation by way of energy mobility through batteries.

Specifically, it is the -100 mesh natural graphite concentrate (fines) used in the production of the anode in lithium-ion batteries that has analysts predicting the market will enter a period of unprecedented growth.

And that's where graphite miner Black Rock Mining comes in, boasting a simple formula behind its path to success, achieved by its geological and geographical advantages that combine to offer a low risk, high-margin operation.

"We have an IRR of 44.8% and an all-in operating cost of $397 per tonne, for a product that sells for about $1300 per tonne," says Black Rock Mining CEO, John De Vries. "So for every dollar of cost, we pull in about $3 of revenue and that's just a stunning business."

Black Rock Mining currently has a 100% interest in the Mahenge Graphite Project in Tanzania which hosts a Mineral Resource Estimate of 213m tonnes @ 7.8% TGC, and a reserve of 70m tonnes @ 8.5% TGC. This makes Mahenge the world's second-largest reserve and the fourth-largest (JORC compliant) flake resource.

Mahenge is spread across 324 square kilometres of exploration tenements in Tanzania's Ulanga district, approximately 250km north of the border with Mozambique, 250 km west of the coastal port city of Mtwara on the Indian Ocean and 300 km southwest of Tanzania's largest city, Dar es Salaam.

The company's enhanced Definitive Feasibility Study for the project considers a four-stage construction schedule to deliver up to 340,000 tonnes per annum of 98.5% premium graphite flake concentrate for 26 years – with the ability to produce Ultra Purity flake of 99%.

Black Rock has also undertaken the largest graphite qualification program globally, with over 600 tonnes processed across a number of pilot plant operations as part of extensive customer qualification works. This has allowed the company to attract serious interest from customers.

First production is targeted for Q4 CY2023 and is already completely underwritten by off-take agreements Black Rock has in place, including a strategic alliance with Korean steel-making giant, POSCO, which is one of the world's largest battery anode material producers and a key participant in the global lithium-ion battery industry.

The alliance between the two companies involves POSCO's 13% stake in Black Rock along with an off-take agreement with a US$10m prepayment facility, and provides Black Rock with a clear path to market.

The leadership team at Black Rock Mining packs quite a punch, with Board and management that span decades in the resources sector, all with real world experience needed to execute on developing the tier 1 scale graphite mine that Mahenge represents.

The company is currently working on project finance for Mahenge, early works and recruiting for key roles in Tanzania which is aimed to finalise in the coming months with a view to begin construction of the mine later this year.

BLACK ROCK MINING LIMITED

KEY INVESTMENT HIGHLIGHTS

JULY 18, 2022: Black Rock makes senior appointments for Tanzanian leadership team.
FEBRUARY 3, 2022: BKT confirms 25% increase in measured resources.
DECEMBER 14, 2021: Black Rock signs framework agreement with Tanzania government.

STEVE LYNN
CEO

CANNON RESOURCES

(ASX:CNR)

- **Company Name:** Cannon Resources
- **Company ASX code:** CNR
- **Key commodities:** Nickel
- **Key Personnel:** Steve Lynn, CEO | Alex Passmore, Non-Exec Chairman Director | Chris Hunt, Company Secretary
- **Locations:** Western Australia
- **Market Cap as of 15/07/22:** $25.63M
- **Share price range over 12 months as of 15/07/22:** $0.655 - $0.245
- **Company Website:** cannonres.com.au

COMPANY PROFILE

Cannon's progress since listing in August last year has been nothing short of impressive.

At the time its flagship Fisher East project boasted a resource of 78,000t at 1.9% nickel across three deposits – Camelwood, Cannonball and Musket.

The secondary Collurabbie project some 65km to the east contained 0.573Mt of ore at 1.63% nickel, 1.19% copper, 0.082% cobalt and 1.49g/t and 0.85g/t respectively of platinum group elements palladium and platinum.

It has since been busy building on those resources, boosting Fisher East's inventory by 49% to 116,300t at 1.8% Ni, including a 44% increase at Musket (45,500t at 1.9% Ni) and a maiden resource of 24,500t at the new Sabre deposit.

"It was clearly under drilled in areas like Sabre and the down plunge extension of Musket," Cannon CEO Steve Lynn says.

"So there was plenty of scope to do fairly rapid work and rapidly increase the resource as a consequence, and that's what we did - we went in hard. We backed ourselves."

Geologist Lynn has played a key role in the discovery of nickel and VMS style base metal deposits in WA across a global career with stints at majors like IGO, Great Central Mines and Gold Fields.

Cannon's emergence has dovetailed with a rapid rise in the nickel price, trading over US$20,000/t consistently this year and briefly touching record levels of ~US$50,000/t in March.

"I call it 'next level', because we had an existing and substantial resource. When Cannon first got it, we had 78kt of contained nickel at good grade of just under 2%," he said.

"There's still a lot of upside at Musket because it's still completely open down plunge and all the deposits are completely open down pledge for that matter."

High grade results in recent drilling at Sabre have improved the outlook even further.

"I'm hopeful for an uptick in the tonnes and I'm also hopeful for an uptick in the grade," Lynn said.

Fisher East and Collurabbie are 'class 1 nickel', the kind historically produced in Australia by companies like Western Mining Corporation, BHP and Mincor, which is the main feedstock for nickel in batteries.

While nickel is supplied primarily to stainless steel producers, the biggest growth market for the commodity is in EVs, batteries and energy storage.

"The big change in the outlook at the moment is people realise high performance batteries for electric vehicles and storage of electricity are going to be in high demand and it's going to become an increasing component of the use of nickel," Lynn said.

"At the moment the very high performance batteries used by Tesla and some of the other manufacturers use around 80% nickel in the cathode."

It is a direction BHP has been heading after securing major supply deals with EV makers Tesla and Toyota. That bodes well for Cannon, which is ideally placed to be a supplier of class 1 nickel to BHP, with its nearby Mt Keith and Leinster concentrators within 200km of Cannon's deposits.

Lynn says scoping studies will take place soon at Fisher East, with feasibility studies planned for 2023 and 2024 and a final investment decision likely towards the end of 2024.

CANNON
RESOURCES

KEY INVESTMENT HIGHLIGHTS

JUNE 21, 2022: Cannon reports high grade results from drilling at the Sabre nickel deposit including 5.7m at 4.5% nickel from 310.28m and 8.3m at 2.7% Ni from 132.95m.
APRIL 5, 2022: CNR boosts Fisher East nickel resources by total 49% to 116,300t with maiden resource at Sabre after upgrading Musket deposit.
AUGUST 12, 2021: CNR lists on the ASX in a $6m IPO.

TARA FRENCH
MANAGING DIRECTOR

CAZALY RESOURCES
(ASX:CAZ)

- **Company Name:** Cazaly Resources
- **Company ASX code:** CAZ
- **Key commodities:** Copper, cobalt, nickel, graphite, silver, zinc and gold.
- **Key Personnel:** Tara French, Managing Director | Clive Jones, Executive Director
- **Locations:** Western Australia, Southern Africa
- **Market Cap as of 15/07/22:** $14.09M
- **Share price range over 12 months as of 15/07/22:** $0.054 - $0.036
- **Company Website:** cazalyresources.com.au

COMPANY PROFILE

Cazaly Resources (ASX:CAZ) has strengthened shareholder positions through its strategically diverse commodities portfolio, a tactic keeping the resource development company ahead of the curve when it comes to market movements.

Founded in 2003, the mineral explorer's projects stretch from Western Australia to Southern Africa and focus on delivering an in-demand variety of critical battery metals.

The Perth-based company is particularly strong on copper, a metal powering the electric vehicle boom and global decarbonisation.

It's working on satisfying copper hunger through a handful of key tenements, including a highly prospective position in east Kimberely.

So far, the Halls Creek Copper Project has produced an optimistic outlook for significant quantities of the red metal, zinc, and silvers.

The east Kimberley Project already has drilling underway following the identification of a large mineralised system in the Bommie Porphyry Target.

Cazaly Resources' exploration teams have delivered exceptional results so far, including 178m @ 0.3% Cu; 170m @ 0.4% Cu; and 92m @ 0.4% Cu.

The campaign is currently determining the lateral extent of the system with some holes testing depths to 300m, with an inferred copper resource expected by the end of the year.

The Bommie Porphyry Copper work is the latest in a pipeline of activity at the Halls Creek Project, which sits within a district known for several massive copper sulphide deposits.

It's one in a variety of Australian positions currently under the mineral explorer's belt, which focus on a broad range of commodities spanning copper, cobalt, nickel, graphite, silver, zinc, and gold.

The diverse domestic tenements are joined by the Kaoko Copper Cobalt Project in northern Namibia, in which the Australian company holds a 95% interest.

The Project is one of Cazaly Resources' largest, spanning 100km in length and covering an area of roughly 1410 square kilometres.

It's situated in the Neoproterozoic Kaoko Belt, thought to be the western extension of the Central African Copperbelt.

Bordering northern Zambia and the southern Congo, the Copperbelt was previously considered the largest and highest sediment-hosted province for the electrical conductor on Earth.

Exploration teams have already found indicators of a large hydrothermal mineralised system, including widespread surface-level copper mineralisation with broad areas of veining malachite, chalcocite, and galena.

Back in Western Australia, similarly promising is the Kimberley region's McKenzie Springs Project, a joint venture between Cazaly and Fin Resources at 30% and 70% interest respectively.

The tenement is located along the strike to the Savannah Nickel Mine and sits adjacent to the Macintosh Graphite deposits, positioning it to be brimming with nickel, graphite, copper and cobalt.

Graphite is an especially exciting opportunity for the mineral explorer due to the commodity's extraordinary market growth stimulated by economies shifting towards green technologies.

Similar to lithium and copper, graphite is considered a key element to this transition, and is needed in lithium ion batteries, super capacitors, nuclear reactors, steel and refractories.

The Project has significant potential to host high quality graphite mineralisation following the historic discovery of outcropping graphitic schist in the high grade Tickalara Metamorphic suite, which trends through the site at 15km in length.

CAZALY
RESOURCES LIMITED

KEY INVESTMENT HIGHLIGHTS

JUNE 27, 2022: Electromagnetic conductor plates have been modelled down plunge of the Mount Angelo North Cu-Zn-Ag deposit, and at the new Moses Rock prospect. This prospect sits within the Halls Creek Copper Project.

JUNE 20, 2022: VMS Copper-Silver-Zinc Resource at Mount Angelo features intercepts such as 64m grading 2.72% copper and 1.13% zinc.

MAY 24, 2022: Drilling for indicated resource at the large Bommie Porphyry Copper Prospect.

JOE KADERAVEK
CEO

COBALT BLUE HOLDINGS

(ASX:COB)

- **Company Name:** Cobalt Blue Holdings
- **Company ASX code:** COB
- **Key commodities:** Cobalt, elemental sulphur
- **Key Personnel:** Joe Kaderavek, CEO | Dr Andrew Tong, Executive Manager | Joel Crane, Investor Relations / Commercial Manager
- **Locations:** Broken Hill NSW
- **Market Cap as of 15/07/22:** $201.22M
- **Share price range over 12 months as of 15/07/22:** $1.03 - $0.23
- **Company Website:** cobaltblueholdings.com

COMPANY PROFILE

Operating out of far-western New South Wales' spiritual home of mining, Cobalt Blue is a company with a very clear ambition – to become one of, if not the largest, cobalt producers on the planet.

It's a lofty ambition, but the company says that it's well on its way to being noticed by a number of heavyweights in the battery industry – More than 50 of the world's largest battery manufacturers have their attention focused firmly on its Broken Hill Cobalt Project.

That project sits about 25km south-west of its namesake town, occupying some 37km^2 of a broader tenement holding of almost 220km^2.

The geology underpinning the Broken Hill Cobalt Project carries with it a superb pedigree, as it's located in a region that is known worldwide for producing simply enormous quantities of raw materials that are processed and used in manufacturing throughout countless sectors.

Perhaps even more critically, given the number of existing operations in the region, access to established solutions in equipment and logistics is vastly simplified over other companies that have needed to strike out further afield, and face issues with moving its product to buyers.

Cobalt Blue's 100% wholly-owned tenement of projects sits atop a deformed and metamorphosed Proterozoic supracrustal rock succession named the 'Willyama Supergroup', which hosts many metalliferous occurrences, including the giant Broken Hill lead-zinc-silver orebody.

The approach taken by Cobalt Blue is one that the company is rightly proud of, given that it's low-cost, and utilises a process that separates over 80% of the waste from the ore at the first step, which means Cobalt Blue will end up refining less than 20% of the material brought out of the ground, to produce a 0.5% cobalt content concentrate.

Guiding the project is CEO Joe Kaderavek, who has held senior management roles with Price Waterhouse Coopers, Five Oceans Asset Management, and Deutsche Bank.

Over the course of his career, Kaderavek has managed investments in the global resources and minerals processing industries, including the management of turnaround projects supporting corporate targets, mergers, and divestment activities.

Alongside Kaderavek on the board of directors is Robert Biancardi (Independent Chairman), who has held senior roles with numerous major corporations over 35 years, including IBM, Citibank, Westpac, and Evolution Healthcare.

Also on the board are former Managing Partner at Blake Dawson (now Ashurst) and its predecessor firms Hugh Keller, and Rob McDonald, who held Business Development and Strategic Planning roles with the Rio Tinto Group for more than a decade.

The company's executive manager Dr Andrew Tong, is a metallurgist with over 20 years' experience in project development, mining and processing, including roles such as CEO and Board roles for Compass/Northern Territories Resources, Goldsmith Resources (Peru) and Australia Gold.

Cobalt Blue is a proud member of the Future Battery Industries Research Program, and says that its current partners are among the top tier of the world's battery manufacturers, and that having these commercial relationships in place at this stage in the project demonstrates its potential.

Its demonstration plant is currently operational, to provide proof of concept for the project to deliver its product free from the unethical and unsustainable conditions or the poor environmental practices typical of third world extraction.

CobaltBlue

KEY INVESTMENT HIGHLIGHTS

JUNE 20, 2022: Ore extraction underway at COB Demonstration Plant, Broken Hill.
APRIL 28, 2022: Broken Hill Cobalt Project awarded $15m Critical Minerals Accelerator Federal Government Initiative Grant.
MAR 2, 2022: Broken Hill Cobalt Project granted major project status by Australian Federal Government.
DECEMBER 21, 2021: COB executes Memorandum of Understanding ('MOU') with Queensland to explore extraction of cobalt from existing mine waste.

GUY LE PAGE
EXECUTIVE DIRECTOR

CONICO
(ASX:CNJ)

- **Company Name:** Conico
- **Company ASX code:** CNJ
- **Key commodities:** Copper, nickel, cobalt, gold & PGE's.
- **Key Personnel:** Guy Le Page, Executive Director
- **Locations:** Western Australia
- **Market Cap as of 15/07/22:** $42.10M
- **Share price range over 12 months as of 15/07/22:** $0.098 - $0.011
- **Company Website:** conico.com.au

COMPANY PROFILE

Conico (ASX:CNJ) is positioning investors to capitalise on the delivery of a rich mix of base and precious metals following multiple key advancements to their tenements this year.

The fast-moving mineral explorer has found success in multi-element projects in Greenland and Australia that heavily feature metals critical to the global construction and manufacturing sectors.

The promising Greenland tenements are matched only by Conico's Mt Thirsty Project (Conico 50%, Greenstone Resources 50%), located in Western Australia's world-renowned Goldfields-Esperance region, just 16km north of Norseman.

The recent discovery by Galileo Mining Ltd (ASX: GAL) of Cu, Ni and PGE's only 200 metres north of the tenement boundary has sparked renewed interest in the hard rock potential of the region with a RC and Diamond drilling program scheduled to commence in August of this year.

Following a 2020 Pre-Feasibility Study on the oxide resources, Mt Thirsty has demonstrated its status as one of Australia's most advanced genuine cobalt projects.

With ongoing discussion around Western Australia's almost unrivalled capacity to support the lithium-ion battery market, cobalt in particular is presenting a timely and lucrative opportunity for investors.

Conico have hailed the wider Kalgoorlie-Norseman area as a "cobalt region" and the company believes there is potential for more advanced, low capital cost and high-quality cobalt projects.

Greenland has proven to be a particularly exciting opportunity for the Western Australian company and is drawing the world's attention for its deposits and reserves of rare-earth minerals, gems, uranium, iron ore, oil, and gas.

A geochemical analysis on Conico's multi-element Ryberg Project also created much buzz after the site was found to be a hotbed of copper, nickel, cobalt, palladium, and gold.

The company moved quickly to pull results from the site after it acquired private United Kingdom explorer Longland Resources and assumed control of the asset in 2020.

Spanning roughly 452lkm2 on the east coast of Greenland, Ryberg is an under-explored resource of six significant prospects wholly owned by Conico.

One of the most noteworthy prospects is Sortekap, which delivered the first orogenic-gold occurrence found on Greenland's east coast.

On July 12, the mineral explorer revealed they had successfully mobilised a field team to the operational camp and were poised to begin drilling activities on key copper, nickel, gold, and platinum group element targets.

Conico executive director Guy Le Page said the company also acquired two more diamond drill rigs to increase their output at the wholly owned Mestersvig Project this year.

"The equipment is in near new condition – it has only been used in 2021 - and is located nearby in Ryberg," Le Page said.

"Drilling operations at both Ryberg and Mestersvig will therefore be occurring simultaneously until the end of the field season."

Also located on Greenland's east coast, the Mestersvig Project is a key zinc-lead-copper-silver tenement that contains the historic Blyklippen Mine.

Conico largely has its eyes on multiple mineralised occurrences along 13km of untested strike length stemming from the notable lead-zinc mine.

Observers agree zinc is on its way to be a hot commodity, since the United States Geological Survey added it to its 2022 critical minerals list and export credit agency EMIX bank provided US$657m in debt funding to develop a lead-zinc project in northeast Greenland.

KEY INVESTMENT HIGHLIGHTS

JUNE 16, 2022: Mt Thirsty Exploration pivots towards PGM's after Galileo Mining discovers platinum-palladium-gold-copper-nickel hit of 33 metres @ 2.00g/t 3E4 (1.64g/t Pd, 0.28g/t Pt, 0.09g/t Au), 0.32% Cu & 0.30% Ni from 144m, just 200 metres from the tenement boundary of Mt Thirsty.

JULY 12, 2022: CNJ Drilling team arrives on site at the Ryberg project (Cu, Ni, Co, Au, PGE's) in East Greenland and immediately begins drilling activities. Exploration at Mestersvig (Zn, Cu) to follow later in July 2022.

TIM MASON
CEO

EAGLE MOUNTAIN MINING

(ASX:EM2)

- **Company Name:** Eagle Mountain Mining
- **Company ASX code:** EM2
- **Key commodities:** Copper
- **Key Personnel:** Charles Bass, Managing Director | Tim Mason, CEO | Manuel Ramos, CEO US Operations
- **Locations:** Arizona, USA
- **Market Cap as of 15/07/22:** $56.33M
- **Share price range over 12 months as of 15/07/22:** $0.910 - $0.190
- **Company Website:** eaglemountain.com.au

COMPANY PROFILE

An Australian success story working hard in the deserts of Arizona in the United States is Eagle Mountain Mining, which is currently in the process of recommissioning Oracle Ridge, an existing underground mine with 18km of development, on the hunt for copper.

The company has headed into the project with the clearly-stated aim of being a low emission producer at its high-grade Oracle Ridge project, to supply the rapidly growing green energy market, which it is right on track to achieve.

The company says that the Oracle Ridge site was only last mined in the 90s, but it is coming into the project with the very strong sense that a change in perspective, a better understanding of how to find the copper and the desire to capitalise on its early exploration results will deliver in spades.

Those exploration results include an updated JORC Resource that shows a 36% increase in contained copper, including 17.0 Mt grading 1.48% Cu, 15.09g/t Ag and 0.17g/t Au – figures that CEO Tim Mason is very excited about.

Additionally, multiple thick and high-grade zones of mineralisation continue to be intercepted outside existing MRE, such as 55.3m at 2.16% Cu, 17.15g/t Ag and 0.54g/t Au, and 30.7m at 2.54% Cu, 21.84g/t Ag, 0.42g/t Au.

"We're feeling very positive about our future here," Mason says. "Copper is a highly sought-after resource at the moment, and demand does not look like dropping off dramatically at any time in the near future."

Mason says that you only need to take a quick look at who Eagle Mountain's neighbours are in the area that it's currently working to see why the company has chosen this site to explore.

The Oracle Ridge Copper Mine is nestled in among some of the biggest names in global mining, including BHP's San Manuel mine, BHP / Rio Tinto's Resolution mine, Asarco's Mission, Ray and Silver Bell mines, and Freeport McMoRan's Morenci, Miami and Twin Buttes / Sierrita mines.

Mason says that there are a number of reasons why Eagle Mountain went with this particular site, but one of the main reasons was a much lower cost to get production underway, due to extensive existing infrastructure

"By working within an existing underground project, we're able to do our exploration and then get our equipment right up to the resource, without having to go through the effort and cost of mining 18km worth of tunnels ourselves," he says.

"And, given that the area has historically been the site of mining, we are confident about existing levels of community support for what we're planning, and there is an enormous amount of infrastructure in place that we can leverage."

Alongside Mason's 20 years' experience in mining and engineering projects, is company founder Managing Director Charles Bass, who brings 50 years' experience in the global mining industry including exploration and mineral processing, through to mine planning on a variety of commodities.

Chief Geologist Fabio Vergara also brings more than 12 years of experience to the table, while Rick Crabb's decades of practicing law at leading law firms combined with Roger Port, a former partner of PricewaterhouseCoopers, rounds out the team at the top.

EAGLE MOUNTAIN MINING

KEY INVESTMENT HIGHLIGHTS

JUNE 6, 2022: Eagle Mountain delivers further positive drilling results at Oracle Ridge.
APRIL 20, 2022: Strong copper results support resource expansion potential at Oracle Ridge.
MARCH 10, 2022: 36% increase in copper ... and growing at Oracle Ridge.

DIETRICH WANKE
CEO

EUROPEAN LITHIUM

(ASX:EUR)

- **Company Name:** European Lithium
- **Company ASX code:** EUR
- **Key commodities:** Lithium
- **Key Personnel:** Dietrich Wanke, CEO | Tony Sage, Executive Chairman
- **Locations:** Focus project in Wolfsberg, Austria; Domicile, Ukraine; Western Australia
- **Market Cap as of 15/07/22:** $92.76M
- **Share price range over 12 months as of 15/07/22:** $0.185 - $0.052
- **Company Website:** europeanlithium.com

COMPANY PROFILE

European Lithium is a mining exploration and development company, listed in Australia, Frankfurt and in the U.S via the OCTQB, with its main focus centred on its wholly owned Wolfsberg Lithium Project in Austria.

From its inception, the company has been developing its advanced hard rock lithium project in the heart of Europe, with the intention of helping to meet the European continent's growing demand for self-sufficiency in the supply of natural resources, specifically critical metals such as lithium.

Thanks to its geographical location, European Lithium has been well positioned to make the most of the worldwide lithium rush that has catapulted many companies well into the realms of the big players.

The Company's Wolfsberg Lithium Project in Austria is located in Carinthia, around 270km south-west of the nation's capital, Vienna.

The project comprises a series of 54 exploration licences and 11 mining licences, centred around an existing historical mine site that has previously seen some large scale exploration and development activities by former owners.

Since acquiring the site, European Lithium has been hard at work developing the project, with a production kick-off slated for early 2025.

In the short term, there are encouraging signs from Austria keeping the Company on the boil and enthusiastic about its work.

The current Measured, Indicated & Inferred JORC Resource totalling 12.88 MT at 1% Li2O in Zone 1, shows upside with mirroring in Zone 2. Drilling in Q1 2018 confirmed a potential doubling of the resource, with follow up drilling planned in the near future.

In addition, the Company says it's in good health financially, with its definitive feasibility study well-advanced, and anticipated in Q3 2022, supported by an interim pre-tax Net Present Value of AUD $823 million.

Outside of Austria, the Company holds the rights to prospective lithium projects in Ukraine. This includes the Dobra lithium project, located in the Novoukrainsky district of the Kirovograd region, around 230km south of Kyiv, and features an exploration target ranging 80 to 105Mt @ 1.1 to 1.4% Li2O.

Further exploration work at the Dobra project is anticipated, however the current geopolitical situation in Ukraine has the potential to hinder operations significantly for the foreseeable future.

European Lithium is managed under the watchful eye of an experienced team including Executive Chairman, Tony Sage, who has more than 35 years' experience in corporate advisory services, funds management and capital raising predominantly within the resource sector.

Sage is based in Western Australia and has been involved in the management and financing of listed mining companies for the last 22 years, operating around the world including in Brazil, Romania, Russia, Sierra Leone, South Africa, Indonesia, China and Australia.

The Company CEO is Dietrich Wanke, who has many decades of experience in management at operational level for underground and open cut mines, and has managed mining operations through all phases, starting from greenfield exploration to full scale production as well as extension of existing mines.

EUROPEAN LITHIUM

KEY INVESTMENT HIGHLIGHTS

APRIL 19, 2022: Positive Interim Npv[6] of A$862 Million shows Wolfsberg Lithium Project is very robust.

APRIL 6, 2022: $30 Million placement to rapidly advance The Wolfsberg Lithium project cornerstoned by leading domestic and overseas investors.

DECEMBER 22, 2021: European Lithium And Traxys Sign MOA For Wolfsberg Cooperation And Offtake Partnership.

PHIL HOSKINS
MANAGING DIRECTOR

EVOLUTION ENERGY MINERALS

(ASX:EV1)

- **Company Name:** Evolution Energy Minerals
- **Company ASX code:** EV1
- **Key commodities:** Graphite
- **Key Personnel:** Phil Hoskins, Managing Director | Michael Bourguignon, Executive Director Technical | Amanda van Dyke, Non-Executive Director
- **Locations:** Tanzania
- **Market Cap as of 15/07/22:** $67.98M
- **Share price range over 12 months as of 15/07/22:** $0.620 - $0.275
- **Company Website:** evolutionenergyminerals.com.au

COMPANY PROFILE

Evolution Energy Minerals (ASX:EV1) is a graphite concentrate project, built around its large Chilalo Project in the eastern African nation of Tanzania.

Chilalo is a standout high-grade coarse flake project, where 58% of the resource is highly prized +80 mesh coarse flake graphite; one of the best in the world.

Chilalo currently has a mineral resource of 20.1 million tonnes grading 9.9% total graphitic carbon (TGC) that includes an ore reserve of 9.2Mt at 9.9% TGC, enough to fuel a mine life of 18 years.

It's not just the size of the project or the grade of the product, but also the purity of its graphite that makes Evolution's Chilalo Project a star.

In June, the company announced that detailed analysis of impurities in Chilalo's 95% C flake graphite fines concentrate has identified extremely low levels of naturally occurring molybdenum and boron.

The newly-understood purity of its graphite opens the door for Evolution to get into two value-added markets; Premium performance batteries, which need extremely low concentrations of molybdenum, and nuclear-grade graphite which requires low levels of boron.

Further testwork has shown that fines material can be purified to 99.9995% C and that its coated spherical graphite far exceeds the specifications required for premium anode applications such as EV's.

"Our pure graphite project will always be a high margin project," Evolution managing director Phil Hoskins explains. "But beyond that, it's very important if you want to build a high-value, large and sustainable business in the graphite space to become vertically integrated into some of the downstream applications."

The mix of 58% coarse / 42% fine means Chilalo graphite will find a ready market in the battery anode market, and allow Evolution to access the growing expandable graphite market, which includes the traditional uses of foils, seals and polymers as well as for fire retardants.

Evolution recently signed a binding offtake agreement with Yichang Xincheng Graphite Co (YXGC) for the sale of 30,000tpa of coarse flake graphite for a minimum of three years, covering more than 50% of Chilalo's production for the first three years and represents more than 70% of forecast revenue over the same period.

"The agreement is the culmination of a significant amount of work that we have undertaken with YXGC over many years and is testament to the strong relationship and mutual respect we enjoy with YXGC," Evolution managing director Phil Hoskins says.

Also high on the company's list of priorities is its commitment to meeting high Environment, Social and Governance (ESG) standards, and was recently accepted into the European Battery Alliance.

This will allow EV1 to engage with key European stakeholders in the battery anode material market strengthening its battery anode material strategy in Europe.

The operation's location in Tanzania has, in the past, presented some challenges, however Hoskins says that a recent change in government is set to change things significantly.

"A new president has come in, and she is very receptive to foreign investors," Hoskins says. "We'll be signing a framework agreement in August that will give us the fiscal stability we need to bring in further financiers."

EVOLUTION ENERGY MINERALS

KEY INVESTMENT HIGHLIGHTS

JULY 18, 2022: EV1 reveals exceptional yields and superior electrochemical properties of coated spherical graphite.
MAY 9, 2022: Evolution signs a 30,000tpa binding offtake agreement with Yichang Xincheng Graphite Co (YXGC).
MARCH 8, 2022: Geophysics investigation highlights potential for multi-decade mine life.

BRETT GROSVENOR
EXECUTIVE CHAIR

FIRETAIL RESOURCES

(ASX:FTL)

- **Company Name:** Firetail Resources
- **Company ASX code:** FTL
- **Key commodities:** Lithium, nickel, copper
- **Key Personnel:** Brett Grosvenor, Executive Chair | Simon Lawson, Non-Executive Director | Steve Brockhurst, Non-Executive Director
- **Locations:** Western Australia; Queensland
- **Market Cap as of 15/07/22:** $15.40M
- **Share price range over 12 months as of 15/07/22:** $0.410 - $0.200
- **Company Website:** firetailresources.com.au

COMPANY PROFILE

Firetail is one of Australia's newest battery metal plays having only made its debut on the ASX a little more than two months ago after raising the full entitlement of $8.125m it was seeking.

The company, which was spun-off from Firefly Resources prior to its merger with Gascoyne Resources, has interests in the Paterson copper-gold project, the M59/358 mining lease (excluding gold rights) and the lithium rights to certain tenements of the Yalgoo gold project.

Additionally, the company holds the lithium rights to certain tenements in the Dalgaranga gold project in Western Australia, and the Mt Slopeaway nickel-cobalt-manganese project in Queensland.

Top of the list are the Paterson and Yalgoo projects, with the former being the recipient of recent data compilation and desktop studies that have revealed high priority areas prospective for copper, gold, molybdenum, lead, zinc, and lithium.

Paterson covers about 1,660km2 of ground containing existing copper-gold prospects – particularly the Wanderer copper-gold-molybdenum prospect – around the historical Kintyre mine.

Drilling by Firefly had returned results such as 17m at 1.6% copper and 317ppm molybdenum and 9m at 2% copper and 272ppm molybdenum.

Further highlighting the project's potential is the geochemical assemblage showing signs of a porphyry intrusion as the source of mineralisation as well as the recent identification of battery metal potential within the central leases.

Firetail plans to continue advancing data compilation and desktop studies to define and rank exploration targets, review exploration techniques to assess priority targets, and assess environmental and Native Title considerations.

Over at the 1,850km2 Yalgoo project in the Murchison region, the company has all minerals except gold at M59/358, which contains a self-sufficient exploration camp, maintenance workshop and a small gold processing plant.

However, the tenement has never been historically explored for its lithium potential.

Firetail also has the lithium rights over several other tenements in the project, where sampling by MacArthur Minerals in 2016 returned results such as 3.75% lithium oxide and 2.41% rubidium oxide.

Adding further interest, Yalgoo surrounds Lepidico's Johnson Well Mine which is host to lithium, caesium and rubidium deposits and abuts Zenith Minerals' joint venture exploration for lithium-caesium-tantalum pegmatites with EV Minerals.

Over at the Dalgaranga project, the company holds the lithium rights on three tenements covering 121km2 in the north and western areas of the Dalgaranga Greenstone Belt within the Murchison region.

Two of the tenements surround the historical Dalgaranga tantalum mine, which is known to host pegmatites.

The project also adjoins the Niobe lithium-rubidium project where Aldoro Resources most of a recent 65 hole reverse circulation drill program intersected pegmatites.

For the 188km2 Mt Slopeaway project, Firetail plans to undertake a Scoping Study to evaluate a simple, low-cost mining operation to produce nickel, cobalt and manganese.

The project is located 100km north-northeast of Rockhampton and straddles the Bruce Highway and North Coast railway.

It was first discovered by BHP in the 1960s and hosts mineralised zones extending from outcrop to the shallow depths that average less than 25m.

Firetail's leadership team has assembled to maximise the company's chances of delivering on its objectives at each of its holdings, with close to a century of combined experience in mining, exploration and navigating the complexities of the corporate world.

KEY INVESTMENT HIGHLIGHTS

MAY 24, 2022: Data compilation and desktop studies reveal high priority areas prospective for copper, gold, molybdenum, lead, zinc and lithium at the Paterson project.

APRIL 13, 2022: Firetail lists on the ASX with a suite of battery metal projects in Queensland and Western Australia after raising $8.125m.

ROLAND HILL
MANAGING DIRECTOR

FYI RESOURCES

(ASX:FYI)

- **Company Name:** FYI Resources
- **Company ASX code:** FYI
- **Key commodities:** High purity alumina (HPA) / critical minerals
- **Key Personnel:** Roland Hill, Managing Director | Claudio Di Prinzio, Technical and Operations Manager | Hans op den Dries, CFO
- **Locations:** Western Australia
- **Market Cap as of 15/07/22:** $58.53M
- **Share price range over 12 months as of 15/07/22:** $0.870 - $0.140
- **Company Website:** fyiresources.com.au

COMPANY PROFILE

In recent years WA has been making a name for itself on the world stage, this time in the field of battery metals, which has seen the state become the go-to for a global market that is quite often at the mercy of severe geopolitical instability and a market that has become almost obsessed with sustainable development of resources and projects.

FYI Resources is one company seeking to capitalise on that market opportunity, through its development of a method that sets its company apart from the rest of the pack, a point of difference that it believes will help it achieve its ambitions.

The company says that it's come up with a way to, quite simply, do things better – which is the Holy Grail for any miner. However, the company says that in this case, its process design has been simplified significantly enough to make a profound difference to the bottom line.

FYI says that's been achieved by designing a simplified 1 stage flowsheet, enabling the company to significantly reduce both capex and opex, to produce consistent, ethically sourced and reliable quality end-product, ensuring a dependable supply for long term contracts.

It's a strategy that has seen FYI team up with Pittsburgh-based aluminium giant Alcoa, combining forces to develop FYI's high purity alumina (HPA) project with a 65% / 35% split, which helps FYI by providing secured funding into the future, de-risking the project for investors.

Alongside Alcoa, FYI Develop, construct and operate a demonstration HPA production facility before moving on to a full-scale 9,000 MT of HPA per annum at its Production Plant) and then bring the HPA produced on the global market.

The results so far have been highly promising, the company says, pointing to its recent HPA pilot plant trial, utilising feedstocks provided by Alcoa. The week-long test phase achieved purity from 99.999% to 99.997% Al2O3.

Driving the project for FYI is Roland Hill, who was appointed to the role of managing director in mid-2014, bringing extensive resource industry and investment, finance and funds management experience with him.

Hill has previously been directly associated with the mining and exploration sector for over 20 years in contracting roles and with Western Mining Corporation and Normandy Poseidon and a seven-year role as Managing Director and Chairman of Crescent Gold Limited – an ASX listed gold producer with production of ~100,000oz pa.

Technical and Operations Manager Claudio di Prinzio brings over 30 years industry experience in project development management, commissioning and operations management across a range of project sizes, commodities and jurisdictions specialising in alumina and battery and critical minerals.

And Chief Financial Officer Hans op den Dries has more than 30 years' experience providing a wide range of businesses with financial, strategic advice and services to small cap unlisted and listed public companies and privately owned businesses in Western Australia's resource-driven industries.

The company says it's also striving to bring its HPA products to market while meeting the sustainability goals that the market demands, which includes Building Environmental, Social, and Governance (ESG) credentials.

FYI says it is committed to providing ESG disclosures against the World Economic Forum (WEF) Stakeholder Capitalism Framework, a set of common metrics for sustainable value creation captured in 21 core ESG disclosures, with that ESG reporting and disclosing produced quarterly.

fyi Resources Limited

KEY INVESTMENT HIGHLIGHTS

FEBRUARY 14, 2022: Demonstrated 99.999% to 99.997% HPA quality from Joint extended pilot plant trial.

JANUARY 18, 2022: Commencement of third joint HPA extended pilot plant trial underway.

RON MITCHELL
MANAGING DIRECTOR

GLOBAL LITHIUM RESOURCES

(ASX:GL1)

- **Company Name:** Global Lithium Resources
- **Company ASX code:** GL1
- **Key commodities:** Lithium
- **Key Personnel:** Warrick Hazeldine, Non-Executive Chair | Ron Mitchell, Managing Director | Dianmin Chen, Non-Executive Director
- **Locations:** Pilbara and Goldfields regions, Western Australia
- **Market Cap as of 15/07/22:** $216.21M
- **Share price range over 12 months as of 15/07/22:** $2.73 - $0.26
- **Company Website:** globallithium.com.au

COMPANY PROFILE

Global Lithium is a rapidly growing lithium exploration company with a focus on two highly prospective Western Australian projects with the company fast tracking exploration at both assets.

That includes a 60,000m reverse circulation drilling program underway at its 100% owned Marble Bar Lithium Project in the Pilbara region, which is its largest program to date.

At its second site, the Manna Lithium Project (80% owned) in the Goldfields region, Global Lithium commenced a 20,000m RC campaign in May, with the company keen to keep its momentum up as the lithium market continues to grow.

As Western Australia's fastest growing lithium explorer with diversified assets in Tier 1 jurisdictions, Global Lithium has attracted the support of cornerstone investors Suzhou TA&A Ultra Clean Technology Co (9.9%) and Mineral Resources Limited (ASX: MIN) (5.0%).

The company shares important asset location synergies with Mineral Resources, a company that enjoys a solid reputation, built on a track record of successfully bringing operations into production quickly, the processing of hard rock lithium ores and downstream processing.

Global Lithium managing director Ron Mitchell says there are four things that make the company stand out from the pack.

"Firstly, the location of our assets, Western Australia, which was recently voted the preeminent mining jurisdiction on the planet, in a report released by the Fraser Institute in April," he says.

"That feeds into the global geopolitical discussion – it's a safe location to do business, and the 'Team WA' brand is well known and highly respected overseas."

"WA accounts for more than 50% of the world's lithium supply in the form of raw materials, and we have two of only 13 JORC compliant lithium resources in Australia," he adds.

Mitchell says Global Lithium's next major selling point is its "best in class" management team, with more than 150 years worth of cumulative experience.

That includes Mitchell's own 25 years' experience in senior commercial, strategy, sales and business development roles, including senior roles at Tinaqi Lithium Corporation and Talison Lithium. He is also the inaugural Chairman of the London Metal Exchange (LME) Lithium Committee.

Non-Executive Chair Warrick Hazeldine and Non-Executive Director Dianmin Chen both have decades of experience to draw on; Hazeldine from more than 20 years in investor relations activities to attract capital, and Chen from more than 35 years' experience in mining industry management positions in Australia, China and Canada.

Third on Mitchell's list is the nature of the resources that Global Lithium is working from, which include a maiden JORC 2012 Inferred Mineral Resource of 10.5 million tonnes at 1.0% Li2O at its Marble Bar deposit.

Exceptional results from further exploration included 28m @ 1.51% Li2O and 46ppm Ta2O5 from 69m, and 9m @ 1.11% Li2O and 42ppm Ta2O5 from 108m.

The company's Manna project is showing substantial promise as well, with a maiden Inferred JORC Mineral Resource estimate for Manna of 9.9Mt @ 1.14% Li2O and 49 Ta2O5 ppm (100% basis).

The fact that Global Lithium has both projects on the boil is the fourth stand-out for Mitchell, who says: "As far as I am aware, we are the only company on the planet currently in advanced exploration campaigns on two independent lithium sites."

KEY INVESTMENT HIGHLIGHTS

JUNE 28, 2022: Drilling results include 12m @ 0.75% Li2O from 41m including 4m @ 1.41% Li2O from 41m at Manna.

MAY 2, 2022: Assay results include 3m @ 2.5% Li2O and 32ppm Ta2O5 from 67m in MBRC0244 including 1m @ 4.1% Li2O at Marble Bar.

MARCH 3, 2022: Global inks 10-year strategic spodumene concentrate offtake agreement with Suzhou TA&A Ultra Clean Technology Co.

MICHAEL MOORE
MANAGING DIRECTOR

GOLDEN STATE MINING

(ASX:GSM)

- **Company Name:** Golden State Mining
- **Company ASX code:** GSM
- **Key commodities:** Lithium, Gold, Base Metals
- **Key Personnel:** Michael Moore, Managing Director | Damien Kelly, Chairman | Geoff Willetts, Exploration Manager
- **Locations:** Western Australia: Yule in the Pilbara, Payne's Find in the Murchison and Four Mile Well in the Northern Goldfields
- **Market Cap as of 15/07/22:** $4.88M
- **Share price range over 12 months as of 15/07/22:** $0.165 - $0.039
- **Company Website:** goldenstatemining.com.au

COMPANY PROFILE

Golden State Mining is a West Australian based resources company focused on gold and base metal exploration. The company has three strategic land packages located in very prospective geological settings in WA.

First on the list is the Yule project, located 45km southwest of Port Hedland in the northern Pilbara region of WAand consisting of six granted exploration licences and two exploration licence applications for a total of approximately 730km2.

The project sits in an underexplored, emerging gold, base metals and battery minerals province near De Grey's (ASX:DEG) world-class Hemi discovery, capturing major regional structures including the Sholl Shear and Yule River Shear Zones.

GSM's Four Mile Well Project is located just 9km north of Laverton in the Eastern Goldfields of WA, in a recognised world-class area renowned for its gold and nickel deposits and excellent infrastructure.

Nearby, two significant nickel sulphide deposits (Windarra and Mt Windarra) are located to the west of the project area and the 1.3Moz Lancefield gold deposit is located less than 1km to the south of the project.

Elsewhere in WA, Golden State Mining has a number of tenement application packages in regional Western Australia with a multi-commodity focus reflecting increasing demand in the evolving commodity market.

These include Payne's Find, in the Murchison region of WA, a region where lithium-bearing pegmatites are known to exist but never targeted by modern exploration. GSM's Eucla Basin project, approximately 100km north-east of Balladonia and 300km east of Kalgoorlie, is prospective copper-gold-nickel mineralisation, GSM also has the new Southern Cross East project under application which lies approximately 60km north-east of Southern Cross and 36km east of Koolyanobbing in the central Yilgarn region of Western Australia, where the company is on the hunt for gold.

And last, but not least, GSM has a gold-nickel-PGE project happening at Yamarna, approximately 96kms north-northeast of Laverton, and lead-silver-gold project at Ashburton, 12km southwest of the Kooline airstrip, 135kms west of Paraburdoo.

GSM says it is very excited about the potential of its assets, and the company's technical team is hard at work, managing a number of exploration campaigns as it looks to develop in-ground resources.

GSM is currently led by managing director Mike Moore, a mining engineer from the Camborne School of Mines with over 20 years operational and executive management experience across a diverse range of commodities in Australia, Indonesia, West Africa and Europe.

Moore has previously held senior and executive management roles with a number of companies including Rock Australia Mining & Civil Pty Ltd, Carnegie Minerals PLC and, more recently, with ASX listed Montezuma Mining Company Ltd where he was CEO.

Alongside Moore are Geoff Willetts, Exploration Manager and Damien Kelly, Chairman.

Willetts is a geologist with over 20 years' experience in various commodities including gold, base metals and mineral sands. He has worked in gold mining for several major mining companies, before moving on to base metal and gold exploration with senior roles in listed juniors exploration companies.

Kelly, meanwhile, is the founder and principal of Western Tiger Corporate Advisers, where he has broad corporate and commercial experience spanning more than 17 years

Kelly provides professional services to ASX and AIM listed companies, predominantly in the mining and energy sector, including the initial listing of Sandfire Resources NL.

GOLDEN STATE
MINING

KEY INVESTMENT HIGHLIGHTS

JULY 5, 2022: Gold drilling complete plus additional lithium exploration licence granted at Payne's Find.
JUNE 20, 2022: Drilling at Four Mile Well Gold Project commences.
APRIL 8, 2022: $2.5 million capital raise for major projects in WA.

RYAN PARKIN
MANAGING DIRECTOR

INFINITY LITHIUM

(ASX:INF)

- **Company Name:** Infinity Lithium
- **Company ASX code:** INF
- **Key commodities:** Lithium
- **Key Personnel:** Ryan Parkin, Managing Director & CEO | Adrian Byass, Non-Executive Chairman | Jon Starink, Chief Technical Officer
- **Locations:** San Jose Integrated Lithium Chemical Project in the Extremadura region of Spain
- **Market Cap as of 15/07/22:** $46.65M
- **Share price range over 12 months as of 15/07/22:** $0.225 - $0.094
- **Company Website:** infinitylithium.com

COMPANY PROFILE

With the preponderance of lithium miners cropping up around the world, it makes total sense to discover that there's an Australian company running its own operation in the Extremadura region of Spain, near the border it shares with Portugal, and just 3 hours from Madrid.

And while that may seem like it's a little bit out of the way for an Aussie-led company, Infinity Lithium is most definitely on the European continent by design.

"There is going to be an enormous supply deficiency over the next decade, and that's something that is unavoidable," Infinity Lithium managing director and CEO Ryan Parkin says.

"The European auto-industry's seismic shift towards electrification is rapidly accelerating with EV penetration rates globally already creating a shortage of lithium chemicals. Looking further down the road, lithium mining – and more importantly, lithium chemical conversions for battery grade products – is going to need to increase significantly."

That's why the company has been leading the development of innovative, sustainable lithium processing technologies through its Infinity GreenTech business.

Separately, Infinity has ambitions to develop the EU's second largest hard rock lithium deposit, utilising the highest environmental credentials known for hard rock lithium mining and processing.

"Infinity is ideally positioned for the European market, where by 2030, the region's going to have more than 1000gW/h of lithium-ion battery plants in the pipeline," Parkin says.

"Europe's been very focussed downstream, but ultimately they don't have the material to be able to fuel these developments – and Infinity's global leading project has proven the ability to produce battery-grade lithium chemicals on-site, where the resource is located."

Infinity's integrated lithium chemicals project will not only provide a sensible business case for the extraction and processing of lithium, but also help the company deliver to market a product that is as ecologically friendly as possible.

Infinity's 100% underground extraction methods create next to no disturbance to local terrain as well as reduce dust and noise production, while allowing non-toxic waste products to be reinserted back underground as part of the immediate rehabilitation process.

Operating beneath the surface, Infinity plans to run electrified mining equipment to remove one of the larger carbonised components of traditional mineral extraction, with renewable energy used to power its fleet, its infrastructure and potentially green Hydrogen for its kiln to further minimise the product's carbon footprint.

At the end of 2021, Infinity signed an MoU with Engineering firm Thyssenkrupp to explore the use of Green Hydrogen to power its kiln at San José, once again seeking to eliminate – in a world-first – what is normally one of the higher carbonised components of lithium processing.

In terms of the processing requirements, the on-site conversion plant is set to use stage crushing and flotation resulting in removal of waste and upgrading the lithium grade of the concentrate.

This is followed by blending of the lithium bearing mica concentrate with a benign, recyclable sulphate introduced as part of the roasting process where calcining liberates the lithium, and the material is then leached with water to deliver strong recoveries of lithium sulphate in solution.

The leadership team at Infinity features a raft of senior figures from the mining and business worlds, and draws on the combined nous of Parkin, Non-Executive Chairman Adrian Byass and Executive Director & Chief Technical Officer Jon Starink to ensure that strategic partnerships, business relationships and the fundamentals of the operation as a whole are met.

INFINITY LITHIUM

KEY INVESTMENT HIGHLIGHTS

MAY 3, 2022: Infinity Lithium fast-tracks Greentech lithium chemical conversion process on key deal with Murdoch University.

FEBRUARY 10, 2022: San José produces increased volumes of battery grade Lithium chemicals.

DECEMBER 6, 2021: Infinity & Thyssenkrupp BU Mining to assess Green Hydrogen at San José.

PHIL HEARSE
EXECUTIVE CHAIRMAN

INTERNATIONAL GRAPHITE

(ASX:IG6)

- **Company Name:** International Graphite
- **Company ASX code:** IG6
- **Key commodities:** Graphite
- **Key Personnel:** Phil Hearse, Executive Chairman | Andrew Worland, Non-Executive Director | David Pass, Non-Executive Director Matthew O'Kane, Non Executive Director
- **Locations:** Western Australia
- **Market Cap as of 15/07/22:** $40.46M
- **Share price range over 12 months as of 15/07/22:** $0.460 - $0.245
- **Company Website:** internationalgraphite.technology

COMPANY PROFILE

International Graphite is a Western Australian company, with a clear mission statement: To become one of the first Australian manufacturers to supply high quality battery anode materials to growing international markets establishing a new supply source for technologies that are helping to build a cleaner, greener world.

A relative newbie to the ASX, IG6 only listed in April this year with an IPO that raised A$10 million via the sale of 50,000,000 shares at $0.20 each, which the company believes was testament to the fact that the market has recognised International Graphite – hardly surprising considering the number of reasons why the company believes it's an attractive proposition.

"First and foremost, we're based in Western Australia, which has just been nominated by the Fraser Institute as the Number One jurisdiction in the world for operating in the resources field," says International Graphite managing director, Phil Hearse.

"We have our resource down near Hopetoun, which is a graphite resource with a high-grade zone," Hearse continues. "And we're currently putting a further 7000m of drilling into that to expand the resource, and to upgrade it from inferred to indicated."

The resource near Hopetown is International Graphite's Springdale Graphite Project – two tenements it acquired from Comet Resources (ASX:CRL) – which hosts a JORC compliant Inferred Resource of 2.6 Mt @ 17.5%, representing one of the highest grades of graphite resources.

The resource was initially identified as a high priority drill target and an RC drilling program, completed between December 2017 and February 2018, and a further discovery of two new high-grade zones of graphite mineralisation outside the existing resource was announced in May 2019.

The other selling point of the Springdale Graphite Project is that it is located convenient to International Graphite's proposed downstream processing facility at Collie, which turns the company into a full-service, vertically integrated business in the renewables and battery industries, from the mine to the customer.

"The fact that we have that set in a first-world jurisdiction, in Western Australia – and our focus on the technology side of our business – gives us an edge in development of those technologies, especially for the downstream requirements," Hearse says.

"We're running the two streams of our developments in parallel, so we expect to be producing graphite concentrate from our operation and trucking it directly to Collie, to be processed and brought to market."

While the development of Springdale and the completion of the newest iteration of the processing facility at Collie remain top of mind for International Graphite – and without letting any cats out of the bag – the company isn't putting all of its eggs in the one basket.

"You could certainly say that we're open to considering additional graphite resources here in Western Australia," Hearse says.

International Graphite's MD is also keen to note that the company is zealous about applying its ESG principles to everything it does, especially when it comes to maintaining control over its product supply chain.

"By mining and processing everything ourselves, we are not dependent on any external resources, which will allow us to take our product to market knowing what the product DNA is going to be – a mark of the consistency and quality assurance that will be a really major part of our program," Hearse says.

INTERNATIONAL GRAPHITE

KEY INVESTMENT HIGHLIGHTS

JUNE 28, 2022: Drilling at IG6 Springdale begins.
APRIL 13, 2022: IG6 begins trading on the Frankfurt Stock Exchange.
APR 7, 2022: International Graphite makes its ASX debut.

CHRIS GALE
EXECUTIVE DIRECTOR

LATIN RESOURCES

(ASX:LRS)

- **Company Name:** Latin Resources
- **Company ASX code:** LRS
- **Key commodities:** Lithium, Spodumene, Kaolin-Halloysite, Copper and Gold
- **Key Personnel:** David Vilensky, Chairman | Chris Gale, Executive Director | Brent Jones, Non-Executive Director
- **Locations:** Western Australia, Brazil, Argentina
- **Market Cap as of 15/07/22:** $135.10M
- **Share price range over 12 months as of 15/07/22:** $0.215 - $0.028
- **Company Website:** latinresources.com.au

COMPANY PROFILE

Latin Resources is shaping up as a key player in global energy transformation through their critical minerals projects, tenements poised to satisfy the high demand for commodities accelerating economies towards net zero.

Based in Western Australia, the mineral explorer's cross-continental portfolio boasts a number of exciting projects, including lithium in Brazil, copper in Peru and kaolin-halloysite in WA's Wheatbelt region.

Lithium and copper are underpinning the burgeoning electric vehicle and rechargeable battery markets, while kaolin-halloysite is emerging as a pivotal ingredient in high tech applications such as hydrogen storage and water purification.

Latin Resources is particularly excited about the Brazil-based Salinas Project, a 6,341ha expanse in the under explored and high potential Minas Gerais region.

Outcropping pegmatites containing spodumene over more than 4km2 have already been identified in the Project's Salinas South prospect, which has also produced an anomalous lithium corridor extending across the site.

Assay results from drilling at the Colina Prospect including peak grades of 3.22% and 3.07% have confirmed the continuity of high-grade lithium pegmatites and provided Latin with the confidence to facilitate the fast tracking of mineral resource definition drilling.

After promising Colina assay results results from the Q2 2022 drilling campaign, Latin Resources announced it secured a 1.2 kilometre southern strike extension at the Colina Prospect on July 13.

The new extension doubled the strike length to high-grade lithium pegmatites under shallow cover and beefed up already excellent drilling results that have found wide spodumene rich pegmatites intersected in drill core.

The well-serviced Salinas Project is one in a pipeline of environmentally minded initiatives positioning Latin Resources as a sustainable products powerhouse.

Among the most notable is the WA-based Cloud Nine Mineral Resource, boasting a maiden estimate of 207Mt of kaolinised granite.

This year's drilling activities have exposed significant thicknesses of exceptionally bright kaolinised granite intersected in the Resource in-fill drilling.

The results have elevated Cloud Nine to one of the largest undeveloped kaolin-halloysite deposits in Australia and have positioned it as a 'globally significant' project.

Cloud Nine's exceptional growth potential has encouraged Latin Resources to undertake extensive research into extracting halloysite commercially and discovering new uses.

The company's $3.2 million research venture with independent policy advisor and enviro-tech developer CRC CARE will explore the potential for halloysite to support the agricultural sector as an emissions reduction material.

The three-year research program will look at modifying halloysite and kaolinite minerals to develop feed supplements for cattle and spreadable material that can inhibit and absorb methane.

Latin Resources's portfolio also includes the 100% owned MT-03 Copper Project in Peru and the Catamarca Project, which is the largest hard rock spodumene landholding in Argentina. Meanwhile, the explorer also has a 13% shareholding in multi-asset copper company Solis Minerals.

LATIN RESOURCES

KEY INVESTMENT HIGHLIGHTS

JULY 13, 2022: Latin Resources secures additional tenure of 1.2km at the Colina Lithium Prospect.

JUNE 29, 2022: The permitting and approvals process has commenced for the Cloud Nine Project to enable excavating a trial mining test-pit.

JUNE 27, 2022: Drilling at Colina has confirmed additional wide, spodumene bearing pegmatites below previously reported intersections, with recent drill hole SADD020 intersecting 7.46m of pegmatite with estimated 15-20 per cent spodumene.

ED AINSCOUGH
MANAGING DIRECTOR

LUNNON METALS

(ASX:LM8)

- **Company Name:** Lunnon Metals
- **Company ASX code:** LM8
- **Key commodities:** Nickel sulphides and gold
- **Key Personnel:** Ed Ainscough, Managing Director | Liam Twigger, Non Executive Chairman | Aaron Wehrle, Exploration Manager
- **Locations:** Kambalda, Western Australia
- **Market Cap as of 15/07/22:** $120.58M
- **Share price range over 12 months as of 15/07/22:** $1.25 - $0.34
- **Company Website:** lunnonmetals.com.au

COMPANY PROFILE

Lunnon Metals listed on the ASX just over 12 months ago, with the aim of developing its wholly owned Kambalda Nickel Project in Western Australia.

Since listing, the company has made a discovery at a deposit Lunnon has named Baker (in honour of the driller Graham Baker who operated the rig which made the discovery) inside one of the world's most renowned nickel regions, the Kambalda Nickel Belt.

That nickel belt has a solid history, having produced 1.6 million tonnes of nickel metal since it was first discovered in 1966, by legendary geologist and minerals explorer, Roy Woodall and WMC.

Since then, mining assets in the area have changed hands a few times, but Kambalda based mines have helped to build the fortunes of several companies including Mincor Resources (ASX:MCR), IGO (ASX:IGO), and Panoramic Resources (ASX:PAN) – and sparked the 2000s nickel boom in Australia.

However, the mines that make up Lunnon's Kambalda Nickel Project have essentially sat fallow inside international miner Gold Fields, and no nickel exploration had happened there for around 20 years, Lunnon Metals managing director Ed Ainscough says.

Lunnon Metals was born out of the ACH Nickel business backed by Kambalda mining entrepreneur Ian Junk. In 2014 it sealed a JV with Gold Fields to farm into 51 per cent of the Foster and Jan nickel mines, which had been closed for decades after producing around 60,000t and 30,000t of nickel metal respectively.

After some intensive work by Lunnon, the decision was made to list, on the premise that the ground it controls was underexplored and untouched during the last boom, Ainscough says.

Since listing post a $15m capital raise at 30c, Lunnon's exploration activity has resulted in a 65% increase to the project's Mineral Resource which now stands at 64.3kt @ 2.9% Ni.

This April, Lunnon completed a $30m capital raise and acquired the historical Silver Lake and Fisher Nickel Mines in Kambalda from major LM8 shareholder Gold Fields – another move from Lunnon's "sold with the gold" playbook.

"It doubles our footprint from around 23km^2 as it is currently to 47km^2, so it's still quite a small project – but the address and the endowment of nickel in and around Kambalda means that we're very lucky to have gotten our foot in the door there," Ainscough says.

That $30 million was raised at a solid $0.93, which then ran to $1.30 as the market got behind the deal and saw the potential for significant results.

"Luckily, we've levered off that success," Ainscough says. "We've put that money in the bank and our shareholders stand in good stead over the coming 12 months, while there will likely be a lot of companies struggling with the equity capital market shutting quite quickly."

A big part of Lunnon's success to date comes from its leadership team, which boasts more than 100 years' of combined experience, both in the commodity and – more importantly – the locality of the company's project.

Ian Junk remains an integral part of the business, serving as non-executive director, working alongside non-executive chairman Liam Twigger and highly-experienced exploration manager Aaron Wehrle.

KEY INVESTMENT HIGHLIGHTS

JUNE 14, 2022: Baker First-Time Mineral Resource Tops 15,000t Nickel Metal.
APRIL 14, 2022: $30m Capital Raise Sets Up LM8 For Growth in 2022.
JANUARY 20, 2022: Baker Resource test results return 2.7m @ 10.72% Ni and 10m @ 6.82% Ni.

NICOLE DUNCAN
MANAGING DIRECTOR

NICKELSEARCH

(ASX:NIS)

- **Company Name:** NickelSearch
- **Company ASX code:** NIS
- **Key commodities:** Nickel sulphides
- **Key Personnel:** Nicole Duncan, Managing Director | Dave Royle, Non-Executive Chairman | Andy Pearce, Exploration Manager
- **Locations:** Carlingup Nickel Sulphide Project, WA
- **Market Cap as of 15/07/22:** $11.96M
- **Share price range over 12 months as of 15/07/22:** $0.26 - $0.11
- **Company Website:** nickelsearch.com

COMPANY PROFILE

NickelSearch Limited (ASX:NIS) is a dedicated nickel sulphide explorer, currently focused on advancing its 100% owned Carlingup Nickel Project located close to Ravensthorpe in Western Australia.

The Carlingup Nickel Project includes four currently known nickel sulphide deposits at RAV1, RAV4, RAV4 West and RAV8 spread along over 10 kilometres of strike length.

Among those deposits, which contain shallow mineralisation open in most directions, is an inferred resource of 13.2 million tonnes at 0.6% Ni for 75,100 tonnes of Ni at at RAV8, site of an historical high grade nickel sulphide mine.

Additionally, the project includes a combined exploration target at RAV1, RAV4 and RAV4 West of 300,000 tonnes at 0.9% Ni for 2,800 tonnes of Ni to 9,800,000 tonnes at 0.4% Ni for 41,700 tonnes of Ni.

The Carlingup Project is located approximately 500km south-east of Perth and encompasses belt scale coverage of the known prospective nickel terrain within the Ravensthorpe Greenstone Belt.

The Ravensthorpe Greenstone Belt has the same nickel mineralisation endowment as the Forrestania Greenstone Belt, which hosts IGO's existing nickel mining operations, 100km to the north.

The area covered by the Carlingup Project that has previously been explored, has only seen shallow depth drilling, mostly less than 80m in depth, and NickelSearch is highly confident that significant potential exists for high-grade sulphide nickel deposits at moderate depths.

That optimism is fuelled by early results from the project, including:

- High MgO ultramafic units identified in downhole lithogeochemical study
- Magnetic highs sitting on basal ultramafic host rock contact
- Mineralised basal ultramafic flows identified in previous drilling
- Clusters of Ni sulphide occurrences and Ni anomalies throughout the entire area

An extensive greenfield drilling program is planned, with the aim of discovery of high grade nickel sulphides like RAV8, with the ultimate goal of fulfilling an existing strategic relationship with Alpha Fine Chemicals, a future producer of high purity nickel sulphate used in lithium ion batteries, to supply feed.

NickelSearch is led by managing director Nicole Duncan, an experienced resources industry executive, most recently as a founding member of the Executive Lead Team of South32 following an extensive career with BHP.

Nicole has over 20 years of experience in mining, including exploration, project development and execution, technology and corporate transactions.

The NickelSearch team also includes Non Executive Chairman David Royle, and Exploration Manager, Andy Pearce.

Royle is a geologist with more than 40 years experience in mineral exploration and project feasibility across roles with Newcrest, MIM, Eurasian Minerals and Kentor Gold, and has also managed exploration programs leading to the discovery of major gold and base metal deposits in Australia and Pacific Rim.

Pearce brings significant experience in nickel sulphide exploration having previously worked at Black Mountain Metals and Poseidon Nickel. He will drive the Company's advanced greenfield exploration program initially across its 11 highest priority targets.

The Company says it is optimistic about the exploration potential of its tenements and has set a target of proving up a significant total resource of contained nickel in the coming years, which will provide a solid foundation for future mining operations.

NiS
NickelSearch

KEY INVESTMENT HIGHLIGHTS

MAY 16, 2022: Multiple Greenfield exploration targets prioritised at Carlingup Project.
APRIL 7, 2022: Update on strategic partnership with emerging downstream nickel sulphate producer, Alpha Fine Chemicals.
MARCH 8, 2022: Extensive drill programs underway at Carlingup.

CHARLES SCHAUS
CEO / DIRECTOR

NORWEST MINERALS
(ASX:NWM)

- **Company Name:** Norwest Minerals
- **Company ASX code:** NWM
- **Key commodities:** Copper, lithium and rare earth elements
- **Key Personnel:** Michael Tilley, Non-Executive Chairman | Charles Schaus, CEO / Director
- **Locations:** Western Australia
- **Market Cap as of 15/07/22:** $5.05M
- **Share price range over 12 months as of 15/07/22:** $0.090 - $0.025
- **Company Website:** norwestminerals.com.au

COMPANY PROFILE

Norwest Minerals is a dedicated Western Australian mineral exploration company, having an extensive portfolio of prospective copper, gold and battery mineral projects including lithium and rare earth elements.

The company's various projects are located among world-class mineral discoveries while others have been discovered and boast exciting walk-up drill targets identified by historic drilling, recent surface geochemistry and geophysical programmes.

Top of the list in terms of battery metals, however, is Norwest's 100%-owned Bali Copper Project located in Western Australia, 250kms west of the town of Newman, which covers 41km2 with four main prospects identified along the 8km northwest trending Bali shear zone.

Norwest says the project has been previously mined, with small-scale copper mining occurring in the 1950s and 1960s.

There has been more recent exploration at the project, with drill testing taking place in the late 1980s, with most holes less than 30m deep, but turning up drill intercepts that include:

- 9 metres @ 1.8% Copper and 9 g/t silver from 8 metres downhole,
- 12 metres @ 3.6% Copper and 16 g/t silver from 0 metres downhole, and
- 6 metres @ 7.2% Copper and 27 g/t silver from 17 metres downhole

Further to that, Norwets has had independent geochemistry analysis performed, which the company says has confirmed strong prospectivity for copper mineralisation in the areas previously sampled, as well as many untested zones along and away from the main Bali shear.

There remains plenty of scope for further exploration at the project, and Norwest says it has a 30 hole, 4,000m RC drill programme on the cards for August 2022.

Norwest's other battery metals-focussed project is Arunta West, which covers an enormous 840km2 area located about 600km west of Alice Springs, out near the border between Western Australia and the Northern Territory.

Norwest is currently the majority owner of the project (82% to 100%), which includes three identified anomalies of interest to the battery metals market, featuring one rare earth elements (REE) anomaly, one LCT pegmatite (lithium) anomaly and an IOCG anomaly.

The REE anomaly is a 3km zone of elevated Rare Earth Elements cerium and yttrium – highly prized in the manufacturing of alloys – and lanthanum, which is most commonly used in the production of precision optics.

The company says that the geological setting of that cerium and yttrium anomaly is "almost identical to the Dazzler & Iceman REE deposits at Brown's Range", a project currently operated by Northern Minerals (ASX:NTU), outside of Halls Creek.

The LCT anomaly is a 6km x 2km zone of elevated/coincident LCT lithium (Li), tantalum (Ta) and niobium (Nb), which are recognised as key components for fertile lithium-hosting LCT pegmatites.

Norwest is developing its strategy to further explore and identify it as a workable resource.

Additionally, the Arunta West project is home to a 3km x 1.5km IOGC anomaly with an internal 2.5km x 0.5km gold anomaly, which is along strike from neighbour IGO's (ASX:IGO) Arcee gold prospect.

Norwest has three other major projects, which aren't battery metals-focussed, including its 100% owned Bulgera Gold Project, the 100% owned Marriott Nickel Project and an 84% stake in the highly prospective Marymia East gold and base metals project, all in Western Australia.

NORWEST MINERALS

KEY INVESTMENT HIGHLIGHTS

APRIL 28, 2022: Norwest eyes REE, lithium and IOCG targets as exploration restarts at Arunta West.
MARCH 9, 2022: Arunta West Copper-Gold anomaly detected.
FEBRUARY 2, 2022: High grade gold intersections at Bulgera Gold Project.

DANIEL TUFFIN
MANAGING DIRECTOR

PANTHER METALS

(ASX:PNT)

- **Company Name:** Panther Metals
- **Company ASX code:** PNT
- **Key commodities:** Nickel-Cobalt and gold
- **Key Personnel:** Daniel Tuffin, Managing Director | Dr Kerim Sener, Non-Executive Chairman| Ranko Matic, Executive Director
- **Locations:** Laverton Greenstone Belt in Western Australia, and Northern Territory
- **Market Cap as of 15/07/22:** $13.38M
- **Share price range over 12 months as of 15/07/22:** $0.280 - $0.165
- **Company Website:** panthermetals.com.au

COMPANY PROFILE

Panther Metals is a recently ASX-listed nickel-cobalt and gold explorer with drill-ready targets in the eastern goldfields region of Western Australia and in the Northern Territory.

The company was spun out of London-listed Panther Metals PLC, and listed in December after a $5 million IPO.

In the Northern Territory, Panther holds 100% ownership rights over the Annaburroo and Marrakai gold projects, covering 160km2 over two tenements. The projects are located approximately 100km southeast of Darwin.

But the company's focus is largely on the global battery market, which is expected to grow 9-10 times by 2030 and 40-fold by 2050. In a net-zero world, between now and 2050 over $23 trillion will be spent on batteries.

In Western Australia, Panther holds 100% ownership rights over a group of five granted exploration licenses covering 236km2, and eight applications covering 275km2 of the Tier 1 mining district covering the Laverton Greenstone Belt.

The company's flagship 'Coglia' Nickel-Cobalt Project is located around 50km to the southeast of Laverton, and only 70km east by road from Glencore's hungry nickel and cobalt plant.

Numerous anomalous nickel, cobalt and gold areas had previously been identified via historical drilling and sampling programmes at the location. Prior to listing, the company had already built up around 30 to 50 million tonnes of JORC exploration target (JET) over the area.

Soon after the IPO, maiden drilling kicked off at Coglia, resulting in Panther tabling its maiden mineral resource (MRE) which came in much higher than its promised IPO schedule.

The maiden MRE was 40% larger than IPO at 70.6Mt at grades of 0.7% nickel and 460 parts per million (ppm) cobalt, for 476,000t of nickel and 32,200t of cobalt.

This was well above the tonnage range of 30-50Mt JET the company initially outlined with the grades on target, falling within the 0.6-0.8% nickel and 400-600ppm cobalt ranges expected.

Following this success, the Coglia Project now has two MRE areas – the Northern and Southern core areas – along with a southern exploration target that has recently been defined.

It also has two further drill targets known as East and Central that span ~3.7km2, which means these resources are not yet closed off and may still have legs to run.

Managing director Daniel Tuffin says the resulting MRE was an "outstanding and transformative" outcome for Panther.

"Panther will now commence a review to plan further drilling to infill the South Coglia domain, and test the new Southern JORC, East and Central targets," he said.

A seasoned hands-on mining engineer, Tuffin has led Panther Metals since September 2021 as the company pursued a listing on the ASX.

He's established many successful companies and mining projects, including co-founding private Kalgoorlie gold mining venture Rose Dam Resources, and co-developing the RDSW open pit which to date has produced over 30koz of gold.

Working alongside Tuffin is Non-Executive Chairman Dr Kerim Sener, a 22-year mining and mineral exploration industry veteran.

Sener has been responsible for the discovery of over 4.3Moz of gold in Eastern Europe, and was instrumental in the development of Ariana Resources (LON: AAU) into an active gold mining operation in Turkey.

PANTHER METALS LTD

KEY INVESTMENT HIGHLIGHTS

JUNE 27, 2022: Announced a Maiden Mineral Resource Estimate of 70.6Mt at 0.7% Nickel and 460ppm Cobalt for 476kt of Nickel and 32.2kt of Cobalt (inferred).
JULY 14, 2022: Panther intersected a new shallow broad high-grade gold zone of 15m at 53.94g/t including multiple bonanza grade results and a peak intercept of 1m at 478g/t along with visible gold at the Burtville East Prospect, part of the Merolia Gold Project in WA.

GAVIN LOYDEN
MANAGING DIRECTOR

QEM LIMITED

(ASX:QEM)

- **Company Name:** QEM Limited
- **Company ASX code:** QEM
- **Key commodities:** Vanadium, oil, aluminium
- **Key Personnel:** Gavin Loyden, Managing Director | Chris Vizzuett, Project Manager | Joanne Bergamin, Communications Director
- **Locations:** Julia Creek, NW Queensland
- **Market Cap as of 15/07/22:** $22.5M
- **Share price range over 12 months as of 15/07/22:** $0.145 - $0.260
- **Company Website:** qldem.com.au

COMPANY PROFILE

QEM Limited (ASX:QEM) is a publicly listed company focused on the exploration and development of its flagship Julia Creek Project, covering 250km² in North Western Queensland.

The Julia Creek Vanadium and Oil Shale Project is a unique world class critical minerals resource with the added potential to deliver and utilise innovative energy solutions, while being home to one of the largest vanadium deposits in the world.

The company IPO'd in 2018 with a market cap of $20m.

In 2019, it acquired a permit that increased the total tenement size of the Julia Creek project tenements to 249.6 km2, while exploration and drilling prompted a significant JORC Resource Upgrade which resulted in a 62% increase, to 2,760Mt Vanadium JORC Resource with an average V2O5 content of 0.30%.

Since then the company has continued to explore and expand its resource at Julia Creek, and the 2,850Mt Vanadium JORC Resource now boasts an average V2O5 content of 0.31%, with 360Mt in the Indicated category and 2,490Mt in the Inferred category, with the added benefit of a contingent (SPE-PRMS 2018) in-situ oil resource of 79MMBBls of Oil equivalent in the 2C category, and 696MMBBLs in the 3C category, contained within the same ore body.

The beauty of Julia Creek hosting both the vanadium and a material volume of aluminium contained within oil shale is that it allows QEM to benefit from drilling once to hit multiple commodities, increasing efficiency and driving up margins and long-term shareholder value. The Julia Creek resource has the added advantage that it doesn't contain the metal contaminants that may interfere with electrolyte production. Hence Queensland is ideally suited to develop a globally significant vanadium redox flow battery industry.

So far in 2022, the company has managed to lock in a 64% resource upgrade, successfully commence its vanadium and oil shale pilot plant and complete its 1GW renewables PFS.

Ecology studies, a groundwater monitoring program and QEM's advanced pilot program have also begun, with ESG reporting in place.

Most recently, in early August 2022, QEM announced that the first vanadium and oil extraction results from the pilot plant test program had been delivered, and were highly encouraging,

The QEM-commissioned bench-scale pilot plant at the Melbourne headquarters of HRL Technology Group tested some 6kg of oil shale feed mixed with a hydrogen donor solvent, and returned vanadium extraction efficiencies of 71.5% on shale ash leached by acid for four hours, in line with previous lab results.

Samples used in that test were considerably larger than previous sample sizes, which ranged from 8g to 12g, and provided a window into future prospects for the project as a whole.

Behind QEM's Julia Creek Project is the company's management team, which boasts decades of experience and capabilities in planning, operating and delivering a range of projects in the mining industry.

Gavin Loyden, Founder and Managing Director of QEM, launched the company in 2014 after recognising and acquiring the resource and putting his years of experience behind the company's early capitalisation, initial exploration program and subsequent project development over the past four years.

QEM

KEY INVESTMENT HIGHLIGHTS

AUGUST 9, 2022: First vanadium and oil extraction results from pilot plant test program delivers on expectations

MAY 4, 2022: QEM completes $2.4m placement to accelerate Julia Creek development

MARCH 31, 2022: QEM proactively adopts the global standard for ESG reporting

EDDIE KING
EXECUTIVE DIRECTOR

RAGNAR METALS

(ASX:RAG)

- **Company Name:** Ragnar Metals
- **Company ASX code:** RAG
- **Key commodities:** Nickel
- **Key Personnel:** Eddie King, Executive Director | Steve Formica, Non-Executive Chairman | David Wheeler, Non-Executive Director
- **Locations:** Bergslagen District, Sweden; Western Australia
- **Market Cap as of 15/07/22:** $14.78M
- **Share price range over 12 months as of 15/07/22:** $0.068 - $0.025
- **Company Website:** ragnarmetals.com.au

COMPANY PROFILE

Since relisting on the ASX in May 2021, Ragnar Metals primary focus has been on developing its 100% owned Tullsta nickel-copper-cobalt project in Sweden's Bergslagen district, which has a long history of mining.

At the centre of this is the Granmuren deposit, a substantial intrusion of massive and disseminated sulphides – mainly pyrrhotite, pentlandite and chalcopyrite hosted in gabbros and norites, which appears to have the same style of mineralisation as Vale's major Voisey's Bay mine in Labrador, Canada.

The deposit also appears to be an extension of the Svecofinnian province which has played a long and significant part of neighbouring Finland's smelting and refining success.

Mineralised zones at the deposit tend to occur as long intersections of lower grade material as highlighted by a drill intersection of 63.5m grading 0.3% nickel and 0.51% copper with occasional high grade material encountered in intervals such as 4.5m at 0.81% nickel and 0.7% copper.

However, it is the company's recent deep drilling which really has hearts racing at Ragnar.

This is all thanks to hole 21DDTS007 and its thick 143m intersection grading 0.56% nickel, 0.49% copper and 0.05% cobalt from a down-hole depth of 393.5m with a higher grade zone of 34m at 0.9% nickel, 0.8% copper and 0.08% cobalt.

Of particular note was increasing grade and thickness of mineralisation at depth while a 3D review indicated massive potential upside at depth along the plunge length of the intrusion, within a 240m gap in drilling above the hole, and updip and close to surface in the untested area east of historical drilling.

Adding further interest, a subsequent down-hole induced polarisation and resistivity (DHIP-R) survey defined a very large, highly mineralised gabbroic body 500m long by 450m wide that extends to a vertical depth of about 550m with a down-plunge strike of about 750m from surface.

This testing confirms mineralisation at Granmuren remains open, particularly at depth and has additional lobes/chambers off to the side of the main gabbroic body that are additional target zones for sulphide mineralisation.

The model also coincides with the gabbro host rock and the significant nickel-copper-cobalt intersections in recent holes including 21DDTS007, further highlighting the large-scale potential of the discovery.

To follow up on these results, the company commenced a 3000m diamond drilling program in July, with the first stage of three holes testing for extensions of mineralisation surrounding 21DDTS007. The second stage of four holes will test new target zones identified by the DHIP-R modelling.

Results from this program are expected to be released over the coming weeks or months.

While Granmuren remains the focus of the company's efforts, it is by no means its only project.

Ragnar also holds the Gaddebo nickel project about 20km to the east-southeast as well as the Leeds and Kenya gold projects in the Goldfields and Laverton regions of Western Australia.

The leadership team at Ragnar are all highly-experienced in their respective fields, with Executive Director Eddie King sitting on the board of directors for M3 Mining (ASX:M3M), Eastern Iron Ltd (ASX: EFE), Queensland Pacific Metals Ltd (ASX:QPM) and and Rubix Resources Limited (ASX: RB6), alongside his duties with the company.

RAGNAR METALS LTD.

KEY INVESTMENT HIGHLIGHTS

JULY 18, 2022: Drilling commence at Granmuren.

MAY 17, 2022: Downhole induced polarisation survey confirms mineralisation at Tullsta is open, particularly at depth.

APRIL 12, 2022: Drilling returns a thick intercept of nickel-copper-cobalt mineralisation which highlights the large-scale potential of the Granmuren Deeps discovery.

NOVEMBER 18, 2021: Grant of exploration permit increases the size of the Tullsta project by 16km2.

JULIAN STEPHENS
MANAGING DIRECTOR

SOVEREIGN METALS

(ASX:SVM)

- **Company Name:** Sovereign Metals
- **Company ASX code:** SVM
- **Key commodities:** Natural rutile (titanium), graphite
- **Key Personnel:** Julian Stephens, Managing Director | Ben Stoikovich, Chairman | Ian Middlemas, non-executive director
- **Locations:** Malawi
- **Market Cap as of 15/07/22:** $218.95M
- **Share price range over 12 months as of 15/07/22:** $0.790 - $0.390
- **Company Website:** sovereignmetals.com.au

COMPANY PROFILE

Sovereign Metals owns the first significant natural rutile-graphite discovery anywhere in the world in the last 50 years, and at 23Mt of contained flake graphite, the world's second largest defined graphite deposit.

The company's Kasiya deposit in Malawi recently had a resource upgrade, tripling to 1.8Bt at 1.01% rutile for 18Mt, and a scoping study in June showed the mine would generate US$12 billion in revenue over a 25 years, pumping out US$323m in average annual EBITDA.

Along with 242,000t of natural rutile, last month's expanded Kasiya scoping study showed the unique Malawian ore body can produce 155,000t of high basket price natural flake graphite.

Production cost benchmarking of Kasiya's co-product against peer flake graphite projects positions Kasiya as the lowest operating cost graphite project in the world. Kasiya has an average life-of-mine FOB east Africa operating cost of US$320 per tonne of product (rutile plus graphite), and capex of US$372m.

On an incremental cost basis reflecting graphite production as a co-product to primary rutile production, the operating cost is US$140 per tonne of graphite produced.

Such low flake graphite production costs at Kasiya can be attributed to several factors including:

- The uniqueness of Kasiya, in that flake graphite will be produced as a co-product, whereas typically natural graphite mines produce graphite as the primary product with little or no co- or by-products.
- Proposed large-scale operation that will process soft, friable saprolite-hosted mineralisation mined from surface using low-cost hydro-mining methods. The significant cost savings, compared to hard-rock graphite peers, are realised by Kasiya having no requirement for drilling, blasting, digging, trucking or primary crushing or grinding in the processing plant.
- The project's location just 40km from Lilongwe, the capital of Malawi, brings with it access to important infrastructure including bitumen roads, a high-quality rail line running through the deposit connecting to the deep-water of Nacala on the Indian Ocean and hydro-sourced grid power.

An independent life cycle assessment study has shown the true replacement benefit to the lithium ion battery sector of future production from Kasiya.

Diversification is one part of the story – China currently produces more than 75% of the world's natural graphite, almost all of its synthetic graphite and 100% of the natural graphite anodes used in lithium-ion batteries.

Graphite is regarded as a critical mineral by every major jurisdiction including the USA and EU.

But there will be massive emissions savings as well, that will see Kasiya stack up extremely well from an ESG perspective.

Sovereign will have a global warming potential of just 0.2t CO_2 equivalent for every tonne of graphite produced. That is 5 times less than graphite produced in China's Heilongjiang Province and 103 times lower than the 20.6t CO_2eq generated in the production process for synthetic graphite.

Graphite is forecast to be in extreme deficit, with some saying the shortfall could hit 8Mt by 2040, and natural rutile supply is similarly challenged.

Based on Kasiya's cost profile, extremely low cost profile and production as a co-product with the highly-sought after natural rutile, Sovereign is well-positioned to be a serious major player in the graphite sector for years to come.

SOVEREIGN METALS LIMITED

KEY INVESTMENT HIGHLIGHTS

JULY 7, 2022: Japan's Mitsui signs non-binding MoU for 30,000t of natural rutile from Kasiya, giving Sovereign access to key Asian markets.

JUNE 16, 2022: Expanded scoping study boosts Kasiya NPV by 79% to US$1.54b, slated to produce 265ktpa of rutile and 170ktpa of graphite over a 25 year life.

APRIL 5, 2022: Contained rutile at Kasiya mineral sands mine triples to 18Mt, making it the largest natural rutile deposit and one of the largest natural graphite resources in history.

IAN PRENTICE
MANAGING DIRECTOR

TECHNOLOGY METALS AUSTRALIA

(ASX:TMT)

- **Company Name:** Technology Metals Australia
- **Company ASX code:** TMT
- **Key commodities:** Vanadium and titanium by-products
- **Key Personnel:** Ian Prentice, Managing Director | Michael Fry, Non-Executive Chairman
- **Locations:** 40km from Meekatharra in the mid-west of Western Australia
- **Market Cap as of 15/07/22:** $80.78M
- **Share price range over 12 months as of 15/07/22:** $0.600 - $0.280
- **Company Website:** tmtlimited.com.au

COMPANY PROFILE

Established in 2016, Technology Metals Australia focuses on the development of the Murchison Technology Metals Project (MTMP), located around 40km southeast of Meekatharra in the mid-west of Western Australia.

The Project is focusing largely on vanadium production, a critical mineral that's expected to be used in large scale battery storage solutions. The Yarrabubba deposit also includes limenite, the primary mineral used to produce titanium.

TMT is in the implementation stages of its vanadium project development, and is expected to be making an investment decision by the end of 2022 ahead of construction and planned production in 2024.

The global vanadium price has appreciated significantly over the past 12 months, as global economies are starting to recover from the impacts of the COVID-19 pandemic. In recent times, the European vanadium price has accelerated as a result of the conflict in Ukraine.

It's taken a while for investors to realise the potential of vanadium in the battery metals race, but interest is now starting to pick up rapidly.

Although 90% of the mineral is still used in steel-making, excitement has now grown around the potential use of vanadium as a battery metal.

Vanadium has been identified as the key commodity in what is known as a "flow" battery, sometimes called the Vanadium redox flow batteries (or VRFBs).

VRFBs are suited to large scale applications (stationary storage), such as network support for electricity grid operators and telcos looking to power off-grid communications towers and utility scale installations.

The Murchison Technology Metals Project is targeting a total of +25 year life mine based on M&I (measured and indicated) mineral resource of 50.2Mt at 0.9% V2O5.

The Project consists of two deposits – Gabanintha and Yarrabubba – with the Gabanintha portion already returning a robust definitive feasibility study (DFS), which includes a projected 16-year mine life totalling 29.6 million tonnes of ore reserves at 0.88 per cent vanadium oxide.

Mining licences have been granted, while an offtake agreement has been sealed with China's CNMC Ningxia Orient, a top ten producer of vanadium alloys in China.

The company has also expanded the scope of its MoU with leading Japanese VRFB development company, LE System, for the development of a fully integrated downstream vanadium electrolyte industry in Australia.

A key differentiation between Gabanintha and a number of other vanadium deposits is the consistent presence of the high-grade massive vanadium-titanium-magnetite basal unit, which results in an overall higher grade at Gabanintha.

Meanwhile, the adjacent Yarrabubba deposit is expected to be integrated into the Murchison Technology Metals Project in the third quarter of 2022. The company plans to produce a titanium by-product in addition to vanadium, which TMT sees as complementary to Gabanintha.

TMT is headed by Ian Prentice, an experienced geologist with broad ranging exploration and operational experience across a range of commodities and geographical locations, including Australia, New Zealand, South East Asia and Africa.

He has been involved in the listing and management of a number of ASX-listed resource companies, as well as over six years working as a resource analyst within the equities markets.

TECHNOLOGY METALS AUSTRALIA LIMITED

KEY INVESTMENT HIGHLIGHTS

APRIL 28, 2022: Key milestone in Murchison Technology Metals Project after Danish engineering company, FLSMIDTH, greenlit to start front-end engineering design.

APRIL 21, 2022: High vanadium recoveries of up to 96 and 98 per cent, respectively, were confirmed from the Yarrabubba and Gabanintha deposits.

ANDREW RADONJIC
MANAGING DIRECTOR

VENTURE MINERALS

(ASX:VMS)

- **Company Name:** Venture Minerals
- **Company ASX code:** VMS
- **Key commodities:** Tin, tungsten
- **Key Personnel:** Mel Ashton, Chairman | Andrew Radonjic, Managing Director | Jamie Byrde, Company Secretary
- **Locations:** Tasmania, Western Australia
- **Market Cap as of 15/07/22:** $50.32M
- **Share price range over 12 months as of 15/07/22:** $0.135 - $0.027
- **Company Website:** ventureminerals.com.au

COMPANY PROFILE

Venture Minerals is a majority exploration company based in Perth, Western Australia, operating its current flagship Mount Lindsay Tin-Tungsten Project in North-West Tasmania, which is already recognised as one of the world's largest undeveloped tin deposits.

Venture managing director Andrew Radonjic says the company is excited at the prospect of seeing tin production begin at Mount Lindsay, as demand for the so-called "spice mineral" looks set to remain high, and will continue to keep growing.

The "spice mineral" moniker stems from the fact that there are sprinklings of tin in just about everything we use in our day to day lives, Radonjic says.

"While the average smartphone might only contain about $0.04 worth of tin, it certainly wouldn't function without it."

"There are not that many tin operations in the developed world," Radonjic says. "Renison is really the only other one in Australia, and we're about 12km along strike from that mine in an historic tin producing district."

The company has invested $40 million so far as part of its plan to convert Mount Lindsay into an underground mine and leverage off the previous work done at the site during the current feasibility studies with plans to move towards construction at the site in 2024, and production in 2025.

Moving underground means that tin production at Mount Lindsay is far more ecologically friendly than other current alluvial methods employed in many other developing countries throughout the world, which often involve dredging river beds or the ocean floor.

But that's only part of the ecologically forward-thinking elements of the Mount Lindsay project, as Venture plans to hook into available, renewable hydro energy resources to power the operation.

As a means of keeping cash flowing through the company, Venture is also operating the neighbouring Riley Iron Ore Mine, where production has begun but is currently on hold while the company waits for iron ore prices to improve, and freight prices to go down.

In Western Australia, Venture is currently involved with Chalice Mining (ASX:CHN), with the latter completing an earn-in at Venture's Thor prospect, which the company remains tremendously excited about because of its striking similarities with Chalice's own world-class Julimar Nickel-Copper-PGE target.

Venture and Chalice recently announced a win at Thor, after an Auger Soil Geochemistry program identified two new target areas having magmatic Ni-Cu-PGE sulphide potential, supported by underlying geology that is consistent with the presence of ultramafic rocks.

Meanwhile, at the Company's Golden Grove North Project, it has already identified four priority VMS (Volcanogenic Massive Sulphide) drill targets along strike to the world class Golden Grove Zinc-Copper-Gold Mine.

Naturally, a mining company with this sort of workload on the books isn't operated by one man, despite his three decades of experience as a geologist and senior mining executive, and a career that already has a resource production count in the millions of gold ounces.

Chairman Mel Ashton has enjoyed a four-decade career in chartered accounting, specialising in Corporate Restructuring and Finance and as a Professional Company Director, while company secretary and CFO Jamie Byrde, who is closing in on the 20-year mark for his career and specialises in Financial Management, ASX and ASIC compliance and Corporate Governance of mineral and resource focused public companies.

VENTURE MINERALS

KEY INVESTMENT HIGHLIGHTS

JULY 13, 2022: Chalice Mining identifies new Ni-Cu-PGE targets at Venture's South West Project.

FEBRUARY 15, 2022: Venture dishes up 'exceptional' tin-tungsten at globally significant Mt Lindsay.

DECEMBER 16, 2021: Venture Minerals hauls in 'record breaking' 147m-long tin intercept at Mount Lindsay.

DR FRANCIS WEDIN
MANAGING DIRECTOR

VULCAN ENERGY RESOURCES

(ASX:VUL)

- **Company Name:** Vulcan Energy Resources
- **Company ASX code:** VUL
- **Key commodities:** Lithium and geothermal
- **Key Personnel:** Dr Francis Wedin, Managing Director | Gavin Rezos, Non-Executive Chairman | Dr Horst Kreuter, Chief Executive Officer Germany
- **Locations:** Upper Rhine Valley, Germany and Cesano, Italy
- **Market Cap as of 15/07/22:** $837.07M
- **Share price range over 12 months as of 15/07/22:** $15.90 - $5.00
- **Company Website:** v-er.eu

COMPANY PROFILE

Vulcan Energy Resources is seeking to become an integrated renewable energy and lithium battery chemicals producer for electric vehicles, with zero or even negative net carbon emissions along with low levels of water and reagent consumption, low land use and minimal waste generation, and zero fossil fuel consumption.

Vulcan is already commercially producing renewable energy in Germany, and is aiming to be the largest lithium supplier into the European electric vehicle market, from its globally unique Zero Carbon Lithium™ Project..

THe company's Zero Carbon Lithium™ project is unique because of the renewable heat embodied in its brines thanks to their deep location in the Upper Rhine Geothermal-Lithium Brine Field.

This heat is used to power the lithium extraction – making it carbon neutral – and generate clean, renewable geothermal energy to help fix Germany's energy crisis.

While Vulcan's approach is unique, the lithium extraction and geothermal energy processes are mature technologies or have commercial analogues, essentially de-risking a large portion of the project.

Along with the definition of Europe's largest lithium resource, the construction of a pilot plant which has been operating for over a year, and the acquisition of a geothermal power plant which is generating revenue for the Company, Vulcan's progress since listing four years ago has not gone unnoticed.

The Company's list of agreements reads like a who's who and includes major companies such as chemicals manufacturer Nobian, and MVV Energie AG (MVV), the largest municipal energy supplier in Germany.

Nobian is working with the Company on the development, construction and operation of the Central Lithium Plant, which is a key plank of its commercial plans, while the agreement with MVV includes the supply of renewable heat to 25,000-35,000 households in Mannheim, outside of Frankfurt, an immediate step taken to achieve energy security as the country looks to reduce its reliance on Russia.

Vulcan also reached binding lithium hydroxide offtake agreements with automakers Volkswagen, Stellantis and Renault Group, battery maker LG Energy Solutions and cathode producer Umicore.

However, the deal that really highlights the potential of the Company's Zero Carbon Lithium™ Project is the $76m equity investment into Vulcan by Stellantis, a global top five automaker that encompasses well-known brands such as Opel, Peugeot, Citroen, Fiat and Chrysler.

Managing Director Francis Wedin said that the Stellantis investment was a major tick of confidence by a global auto manufacturer, which has also extended its binding offtake agreement to 2035.

"What's been made very clear to us is that the net zero-carbon footprint of our lithium product is extremely important to them," he added.

"Making sure this project is successful from a sustainability perspective is extremely important to Stellantis – they want to be closer aligned so they can see how we are developing this project and to make sure that it is doing what it says it does, and work together with us every step of the way."

More recently, Vulcan reached an agreement with Italy's largest geothermal energy producer Enel Green Power (EGP) to develop its Cesano license in Italy through a joint scoping study.

Vulcan is well-placed to thrive in Europe, as it aims to produce lithium chemicals from Europe, for Europe, for the battery automotive industry, whilst building out renewable heating production on a mass-scale to help fix the European energy crisis.

VULCAN ENERGY
ZERO CARBON LITHIUM™

KEY INVESTMENT HIGHLIGHTS

JULY 8, 2022: Binding collaboration agreement with Italy's largest geothermal energy producer Enel Green Power to develop its Cesano licence.

JUNE 24, 2022: Vulcan draws $76m equity investment from global top-five automaker Stellantis.

APRIL 6, 2022: Binding purchase agreement with the largest municipal energy supplier in Germany for the provision of renewable heat.

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