COPPER OUTLOOK 2024

Copper waiting in the wings to take the market by storm

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Copper waiting in the wings

After years of false dawns, a looming supply deficit means copper's time in the market sun is imminent

Analysts have been predicting a profound copper supply deficit is just around the corner for several years, but it has been slower to materialise than most forecasters predicted.

However, years of underinvestment in the sector, a paucity of new discoveries, shutdowns and an energy transition dependent on copper are now combining to mean a shortage is virtually inevitable.

These converging forces have previously been kept at bay thanks to a global macroeconomic climate marked by high interest rates and high inflation in most major economies, which served to adversely impact growth, and with it the demand for copper.

That the price of copper remained relatively stable against this tumultuous backdrop says much about its inherent resilience and impeccable credentials for the future to come.

Global inflation is set to fall across 2024, while many, such as the **International Monetary Fund's Gita Gopinath,** are predicting central bank interest rates will likely be cut at scale in the second half of the year. This forecasted easing of downward market pressures suggests a sharp move upwards in the copper price could be in the offing.

"Years of underinvestment in the sector, a paucity of new discoveries, shutdowns, and an energy transition dependent on copper are now combining to mean a shortage (of the metal) is virtually inevitable."

Dominic Hale, *Mining Journal*

PolarX Strongly Backed by Gold Major

Australian junior enjoys strong support for its USA project portfolio.

Advanced ASX-listed mineral explorer and developer PolarX (ASX: PXX) can point to rapidly growing high-grade copper, gold and silver projects in tier one US jurisdictions, Alaska and Nevada. The junior enjoys strong support from Australian gold major, Northern Star Resources.

Executive chairman Mark Bojanjac described PolarX's Alaska copper-gold projects, Caribou Dome and Zackly, as the company's "low hanging fruit".

The addition of the Humboldt Range gold-silver project in Nevada serves to move the company into 'maximum uplift territory'. It means that even when the Alaskan winter demands exploration tools must be downed, PolarX can shift its focus south to keep the news flowing.

Enhanced economics

Greater certainty about future economics was achieved for the Alaska Range project from studies showing critical mass could be achieved by combining Zackly and Caribou Dome. These also confirmed that a sole processing plant could be used to handle the different future ore types.

Remodeling the resource to include PolarX's recent drilling saw its size increase by 2.6 times. Laboratory work also led to significantly enhanced metallurgical recoveries. As Bojanjac described it, "What we found was that even just a small increment in metallurgical recoveries and concentrate grades could double its economic returns."

An updated January 2024 scoping study has served to supercharge the projected economic returns for Alaska Range. It puts the projected pre-tax net present value (NPV) at A$625 million over 9.5 years, with capital payback of A$226 million in fewer than 18 months. The combined Zackly/Caribou Dome project is set to generate A$10M/mth of net cash flow over the life of mine and shows a 74%internal rate of return.

PolarX executive chairman Mark Bojanjac

Rig at Caribou Dome project

These robust and alluring statistics at Alaska Range are driven, in part, by its very high-grade copper. This is especially the case at Caribou Dome where the resource modelled from surface down to 300m averages 3.1% copper and includes 4-5% copper at surface. Identified mineralisation below the current resource to a depth of 450m is set to be further investigated over the coming months. This provides scope to extend the modelled mine life and even further enhance projected economic returns.

The ASX-listed junior's backers look at these numbers and see the same cause for excitement PolarX sees. The takeaway for investors is that Caribou Dome and Zackly offer immediate tangible upside.

Expert backing

That these developments have not yet translated to the share price is something PolarX managing director, Dr Jason Berton reasons is due in part to the market continuing to overlook base metals for lithium or rare earths.

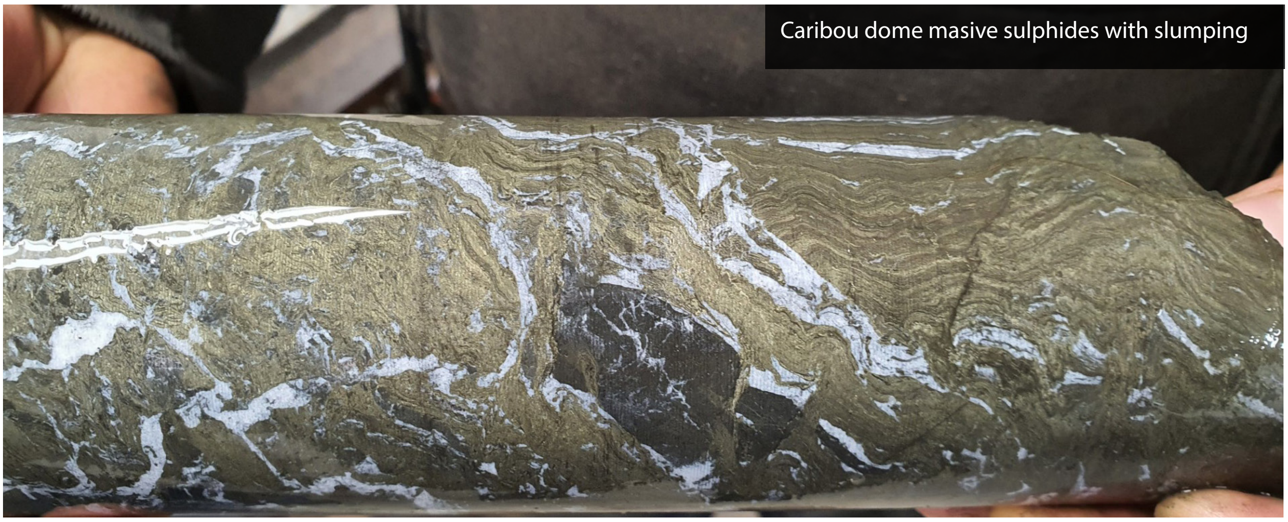
Despite this, recognition of PolarX's potential is not lacking from major shareholders. These include Ruffer Gold Fund and Northern Star Resources, the latter a global-scale Australian gold producer with a A$16.5 billion market capitalisation. Run by fellow Australians with engineering as well as corporate pedigree, Northern Star Resources has Alaskan operational credibility via its Pogo gold producing mine, and has just backed PolarX in no uncertain terms by underwriting a A$5 million raising.

> "What we found was that even just a small increment in metallurgical recoveries and concentrate grades could double its economic returns"

Necessity would appear to be the mother of invention, and a closer position between the two companies could be on the cards as Bojanjac and Berton seek to circumvent the current ASX malaise to secure direct funding to move things forward commercially. As the executive chairman put it, "Our assets are becoming large enough to make a difference to an outfit of [Northern Star Resources'] size and could be a very profitable satellite operation for some sort of combined ownership scenario in the future."

Management pedigree

As to pertinent proven pedigree, Bojanjac has been part of or has led several start-up operations in locations such as China, Mongolia and Ghana that resulted in producing mines. He was also a founding director of a public company that discovered one of Australia's highest grade gold mines at East-Kundana, Western Australia.


Caribou dome masive sulphides with slumping

Berton comes from a structural geological background, and brings to PolarX almost two decades of mining, exploration and private equity investment experience. Having previously been focused on copper and gold exploration in Chile, he was attracted by the sovereign risk-free quality of the Alaska and Nevada jurisdictions.

Nevada project

In parallel with Alaska Range, PolarX envisages big things for its Humboldt Range Project, which it acquired in 2021, extended and at which it conducted the first comprehensive soil sampling programme in almost a century.

The project currently comprises 364 lode mining claims in Nevada in two claim groups: Black Canyon and Fourth of July, and is situated between two large-scale active mines: the Florida Canyon gold mine and the Rochester silver-gold mine. It is easily accessible, historically mined and in a jurisdiction regularly voted first for investment attractiveness by the Fraser Institute.

The state of Nevada is responsible for over 75%of US total annual gold production and, significantly, Humboldt Range is situated in close proximity to the famed Carlin Trend where much of that gold is mined. With soil samples and Induced Polarisation surveys pointing to what Jason Berton describes as "really big targets", it is small wonder PolarX's major shareholders support the expansion of the company's project portfolio in this manner.

2024 priorities

For now, with Alaska's summer around the corner, the focus will be to further increase copper recoveries above 90%, and to prioritise deeper drilling to increase the size of the Caribou Dome resource. In concert, PolarX will be structuring itself with a view to partnering with an incumbent in the region.

The rationale behind this objective includes enhanced purchasing power for key materials, as well as ready access to critical spares, vehicle fleets and an established team with the requisite skill sets. In being able to avail itself of systems already in place, PolarX would be well positioned to accelerate down the pathway to development.

Aside from advancing partnership discussions, the managing director's immediate wish list – which he is confident will be granted given the company's exploration work to date – includes a further significant increase in the NPV and further improved recoveries on the metallurgical front.

And, for Bojanjac and Berton, the pitch to investors is clear: here is a junior with some unusually valuable assets, more than one company maker in its portfolio, and consistent and significant backing from a major gold miner with intimate knowledge of the region in which PolarX is active.

PolarX – at a glance

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Market Capitalisation
A$20 million (as of March 6 2024)

Quoted shares on issue
1.6 billion

Major shareholders
Ruffer Gold Fund 10.8%
Northern Star Resources 10%
US Global 6.2%
Lundin Mining 3.6%
Management/directors 2.3%

Helix Resources: A Systematic Approach to Copper Exploration

ASX-listed junior poised for a new discovery in the renowned high-grade Cobar copper district.

When he took the helm in early 2021 as Helix Resources' chief executive, Mike Rosenstreich immediately set about rejuvenating the business by removing peripheral assets and getting the company well capitalised.

This process resulted in what is now an exclusive focus on the famed Cobar copper district in Central New South Wales (NSW), Australia. Helix Resources can point to some advanced projects in its highly prospective large land package there, such as its Canbelego joint venture with Aeris Resources, in respect of which its copper resource was upgraded in mid-2023.

Data-driven advantage

In what is an unusual approach for a junior mining company, considerable resources have been invested into generating comprehensive geochemical and geophysical regional datasets to create a sound platform from which to launch detailed geological investigations. An area that was

Helix Resources' chief executive, Mike Rosenstreich

Drilling at Canbelego

once an unmapped blank canvas Rosenstreich describes as now being more like "a Jackson Pollock painting in terms of geological detail and texture".

This process of optimisation is allowing for straightforward prioritisation of drill targets – the majority of which are new – and a systematic 'kill or advance'. Rosenstreich, now executive chair, considers that this serves to elevate the company's proposition from the crowd and ensures 'underexplored' could never be levelled at its projects.

This methodical data-driven de-risking line of action is delivering for the company a significant pipeline of technically compelling targets. Given their volume and that they exist in such a prodigiously mineralised environment, Rosenstreich's message to investors is to get in now before the discovery comes.

Embracing innovation

Helix Resources' capacity to screen targets quickly, effectively and cost-efficiently has recently been enhanced by its innovative utilisation of a geophysical surveying technique called Induced Polarisation (IP), not typically employed for 'Cobar' style copper deposits. This allows it to fast-track identification of the most promising drill targets for a new discovery, while affording significant savings on drilling costs.

In early March 2023, the company reported significant IP anomalies around the Canbelego main lode mineral resource. Testing pointed to areas rich in sulphide mineralisation to a depth of 400m and highlighted potential for parallel lodes to increase the scale of the copper deposit.

As well as using cutting edge geophysical data processing techniques to investigate the geological structure, Helix Resources continues to believe in the critical importance of 'boots on the ground'. This sees geologists' observations hybridised with sophisticated modelled interpretations for optimised mapping.

All-in on Cobar

Rosenstreich invoked the exclusive focus on the Cobar region as an inherent advantage for Helix Resources. By not spreading itself thin across different projects in disparate jurisdictions, he explained that there is complete focus of capital. Operational efficiencies are enhanced too by having a stable, experienced exploration team based on the doorstep of its projects in NSW.

New South Wales, in which the Cobar region sits, has experienced several extreme rain and drought-related events in recent years, yet Rosenstreich remains unruffled at the prospect of more to come. He pointed to there being sufficient geographical scale to Helix Resources' land package that even when access to one tenement block may be restricted – due either to muddy conditions or competing agricultural needs – energies can be redirected elsewhere without impacting the overall agenda.

The company's tenements benefit from having several processing plants within range, and are additionally blessed with ready access to towns, sealed roads and power. In being so well served with infrastructure, the Cobar region presents Helix Resources with clear opportunities to commercialise modest resources or – should it be able to get on to a discovery pathway – scope for consolidation.

Sound financial management

While sharing in the widely held view that a significant copper deficit is coming and that one would expect a price response to accompany that, Rosenstreich made clear that Helix Resources is not "relying on an appreciation in the copper price to make its projects work".

"It makes for a more engaged audience if our underlying commodity is on a positive price trajectory, but the current copper price isn't bad if you've got a good enough deposit," he posited.

Rosenstreich regards the company's focus on one commodity and geography as a sensible allocation of the capital it has spent since 2021, and that this speaks to its financial prudence. He explained that while Helix Resources is always looking for new opportunities to raise funds, he is respectful of the existing shareholder base's position and the support it has provided in the form of the capital raisings to date. With A$3 million still in the kitty, there exists a "significant sum of money to get well on the path to demonstrating discovery".

Future set fair

As to whether copper's long-term role in the electric vehicle transition is secure, the chief executive was keen to point out that of all the material EV components its status was assured: Peerless for its durability, malleability, reliability and superior electrical conductivity, everything is pointing to a deficit of up to ten million tonnes of copper by the end of the decade.

In a planned-for leadership development, Rosenstreich will soon be transitioning to a non-executive chair role, with current executive technical director, Dr Kylie Prendergast taking up the mantle. With her profound geological, technical and commercial pedigree, he described the chief executive-in-waiting as an "eminently qualified" recipient of the baton.

The new CEO will inherit oversight of an ongoing pipeline of new targets for drilling and testing, Under Prendergast's stewardship, the focus will remain copper and Cobar, as Helix Resources further refines its expertise in respect of both and continues along the discovery pathway.

As Rosenstreich explained, "Our attitude is that this is a numbers game: Test the targets, progress them forward, or knock them off."

The objective for the discovery company is to add to its existing copper mineral resources at Canbelego through new discoveries to generate multiple style returns for shareholders on their investments. The 'all-in on Cobar' strategy is driven by the region's renown in respect of high-grade copper deposits and the opportunities that come with no less than six processing plants in close proximity to the company's tenements.

Systematic and methodical target generation work has ensured that Helix Resources is now on the cusp of an exciting major drill program to test its series of promising new targets.

Helix Resources – at a glance

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Market Capitalisation
A$9.2 million (as of January 24 2024)

Quoted shares on issue
2.3 billion

Major Shareholders
Mr Bulent Besim 2.8%
Yandal Investments Pty Ltd 2.21%
Ashanti Investment Fund Pty Ltd 1.43%

New World Resources Eyes Up Near-Term Copper Production

Arizona projects rapidly advancing down the development pathway.

With its principal Antler and Javelin projects located in northern Arizona, New World Resources benefits from a jurisdiction marked by excellent security of tenure and support for development. The company's investment proposition is made additionally compelling in that, at 4.1%, it owns one of the highest-grade copper deposits in the world on a copper equivalent basis.

VMS advantage

Managing director and chief executive, Mike Haynes, explained that five years ago the ASX-listed junior had deliberately set about finding a high-grade volcanogenic massive sulphide (VMS) copper deposit that could be taken into production in the second half of the 2020s, anticipating higher copper prices would be kicking in at that juncture. The company is on track to do just that with the now rising spot price providing vindication of its approach.

Historical exploration in the 1970s illustrated the Antler deposit was likely to be part of a much bigger system,

New World Resources Managing Director and CEO, Mike Haynes

New World Resources Antler project site

and so when New World Resources acquired the rights to it in March 2020, the company sought to confirm that hypothesis. After three years of continuous drilling and two resource updates, a high-grade resource of 11.4Mt at a grade of 2.1% copper, 5.0% zinc, 0.9% lead, 32.9g/t silver and 0.36g/t gold (or 4.1% copper-equivalent) was defined. Mining studies have since illustrated this can translate to an initial 13-year life of mine (LOM).

Haynes emphasised advantages VMS-type deposits like Antler afford juniors like New World Resources, over the big porphyry copper deposits favoured by the majors. VMS deposits are smaller yet higher-grade, so they require less development capital and can be brought to production faster and with higher margins, all of which can be managed by the operator, rather than being dependent on other parties for funding and/or management who may have different corporate objectives and timelines to production, he explained.

Win-win

He described Antler as "underpinning New World Resources' value", and considers that any other high-grade deposits within about a 100km range, including those in the Javelin Project area, as providing scope to enhance the development of Antler.

With a 13-year baseline LOM established, any additional high-grade ore discovered within trucking distance of the processing plant earmarked for Antler would have a material impact on the life and/or the economics of not only the Antler project, but also any satellite project, such as Javelin (which is 75km away). Ore discovered at the latter could be trucked to the plant at Antler, or if defined resources were sufficiently large, a stand-alone processing facility could be established, Haynes indicated.

As to the confidence level regarding Javelin, six past producing very high-grade VMS deposits in close proximity have provided New World Resources with good reason to believe the land position it has built there will lead to the discovery of additional high-grade mineralisation.

Sweet spot

Haynes described Antler as being "about as good as it gets from a local jurisdictional perspective".

With no surface water, very few people, and negligible shared land use in the area, headaches are few. Moreover, the deposit sits on private land the company owns, where all the infrastructure needed to mine Antler will be sited. The operation is set to be very compact, with environmental and social impact minimised by developing only an underground mine, and by using dry stack tailings, which is deemed best practice in Arizona. In addition, 50% of the waste product will be put back underground as paste fill.

Haynes added, "Fortuitously, all of that is happening within 15km of an interstate highway; within 15km of transcontinental rail; 50km from a town of 30,000 people; and within 700m of mains or grid power."

Additionally, thanks to long-established relationships in the US, unlike some of its peers, New World Resources has had no problem recruiting suitably skilled personnel, despite a shrinking labour pool that is lingering in the COVID-infused landscape affecting the wider mining sector.

Milestones

Haynes described one of the company's key objectives on the path to production as having already been satisfied, this being the application for a mining permit from the federal government, which it anticipates will be the permit with the longest lead time before approval. Given that impact on federal lands will extend only to running trucks and a temporary water pipeline across them, approval is set to be a formality.

While this federal permit application is being processed, in parallel the company will be applying for relevant state permits, such that, progressively, through 2024 and 2025, it will have a series of permits approved, thereby de-risking the project from an investor perspective.

Exploration potential

VMS deposits like Antler typically occur in clusters. And 6km distant from Antler is another smaller VMS deposit called Copper World. New World Resources holds all the mineral rights between these two deposits, and within this corridor lie multiple high-quality targets where it is believed additional high-grade mineralisation could be discovered. These are currently all virgin, untested targets. But a new drilling programme has just begun, commencing with the high priority Bullhorn target, and likely to be followed by testing of the Cowhorn, Longhorn, Rattlesnake Ridge, Copper Knob, Insulator and West World prospects.

Maximum value

With over $8 million cash at bank at the end of December 2023, Haynes identified New World Resources as having "good cash reserves". He is nonetheless committed to exercising prudence as the company continues to undertake further exploration and advance Antler into production. He described the approach to financing as "a deliberate balancing act between using the financial resources that we've got to maximise shareholder value and minimise dilution before we go back to the market to raise additional cash".

Importantly, study work to date has illustrated the Antler project has extremely robust financial metrics at prices lower than today's spot price. The takeaway here is that, while higher commodity prices would lead to increased revenues, unlike many of its peers New World Resources need not wait for higher prices before it commences production.

Notwithstanding that, Haynes is very confident that a protracted period of higher copper prices is just around the corner. He pointed out that not only has there been chronic underinvestment in the sector, but that high-profile mine shutdowns combined with it being impossible to build mines quickly enough to address supply shortfalls is creating a perfect storm of market forces. As such, the company is well placed to capitalise.

For Haynes and his team, this imminent window of opportunity is driving its two-pronged strategy to maximise returns for New World Resources' shareholders. Namely, to get Antler into production as soon as possible, while concurrently pursuing additional exploration success to increase the resource base.

New World Resources – at a glance

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Mike Haynes – Managing Director/CEO
Tony Polglase – Non-Executive Director
Nick Woolrych – Executive Director and COO

Market Capitalisation
A$90 million (as of March 19 2024)

Quoted shares on issue
2.268 billion

Major Shareholders
Resource Capital Funds Opportunities Fund II 6.9%
Ponderosa Investments WA Pty Ltd 6.0%
Paradice Investment Management 4.9%
Management 4.1%
Top 20 47.3%

China the Harbinger

For most commodities, China is seen as the bellwether of demand: in respect of copper, it is the world's largest refined copper producer and consumer.

Logic would suggest that the depressed Chinese property market of recent years should lead to a significant loss of its appetite for the red metal. Yet, a little publicised fact is that China's imports of copper ore and concentrate are at record highs, customs data showing a year-on-year increase of 9.1% in 2023 for a record figure of 27.5Mt.

The story here is one of a broadening demand base beyond real estate development that takes in the infrastructure needed to support China's huge investment in renewables generation and electric vehicles (EVs).

Marimaca Copper Corp president and chief executive, Hayden Locke, singled out the impact of China's huge investment in solar power – a renewable energy source relying heavily on copper for performance and durability – which he described as "mind-blowing". The country added 14% of the world's total solar capacity in 2023 alone.

For a company like Marimaca, which can point to one of the only major global copper discoveries of the last 10 years at its project in Chile's Antofagasta region, a more diversified demand base is a welcome development. The Marimaca copper project is located in Chile's coastal belt at low elevation and near first class existing infrastructure and utilities. These constitute key ingredients for future development of this high-margin copper project at a relatively low capital investment.

A global transition

The scale of the energy transition to date is less pronounced outside China, the pace of transition slower and more stuttering, and the process occasionally marked by temporary populist policy reversals. However, the direction of travel across the globe is undoubtedly and inexorably towards a move to renewables. Governments worldwide are cognisant of the fact that huge increases in investment in infrastructure will be needed to support this change.

However, many of the more ambitious initial commitments are being scaled back and some of the urgency around the systemic change appears to have tailed off – likely pushed down the priority list by global conflicts requiring immediate and significant attention. For investors, it is worth noting that the likelihood of it taking longer to realise those levels of infrastructure investment could serve to extend copper's anticipated energy transition supercycle.

The world appears to be not so much sleepwalking into a critical minerals crisis that has copper at its heart, as consciously resigned to the gaping supply deficit to come. Yet, while policymakers that have the capacity to exert great enabling influence on both the supply and demand sides may be hamstrung by competing interests at present, there are also reasons why copper projects are not being greenlighted in the way apparent logic would appear to dictate they should be.

Bar set higher

For many mining companies, the incentive price to keep production operating is one thing, the price to bring new production on, another. The increase in acute geopolitical events across multiple regions has attached greater risk to new projects, reflected in higher hurdle rates. This means many miners will be holding out for a much higher copper price than today's before they feel sufficiently shielded from risk to press 'go' on what will be long-term assets.

Given the challenges of securing funding, ASX-listed KGL Resources is one explorer that has been diligently focused on improving key project value drivers including productivity improvements to support project financing. This has led to it progressing optimisation studies and risk mitigation strategies at its Jervois copper project in Australia's Northern Territory.

Helix Resources' Mike Rosenstreich explained that an uber-methodical "kill or advance" approach is the preferred modus operandi for the company at present as it looks to add to its existing copper mineral resources in the renowned high-grade Cobar copper district in central New South Wales. In prioritising, optimising and de-risking in this fashion, it is delivering maximum value to the existing shareholder base that has supported Helix Resources with capital raisings to date.

Such financial prudence is increasingly important in a landscape where funding is proving historically challenging to tap into, as advanced explorer and developer, PolarX executive director, Mark Bojanjac attested to. He explained the company was compelled to look past the current ASX market malaise to forge closer ties with Northern Star Resources to secure funding and move things forward commercially at its copper-gold projects in Alaska.

Aerial view of skyscrapers and landmarks of Shanghai, China

This act of seeing past difficulties to new opportunities is playing out across the copper community as those juniors with the best stories adapt and evolve in their efforts to push through and be well positioned to take advantage of the bountiful market conditions likely to arrive soon.

In host countries where precedent suggests the regulatory landscape is more subject to change at short notice, it has got to the point where the time and capital required to get into production are of such magnitude that even some jurisdictions rich in copper will be considered too high risk for some mining companies. This situation is exacerbated by larger, more vociferous and better organised anti-mining lobbies that must increasingly be listened to by administrations that want to stay in power – Peru and Panama being two prime examples. And, elsewhere, the value of discoveries or the economics of operating mines can be impacted by governments wanting an increased share of the pie, so further deterring investment and compounding the supply challenge.

It is why many in the copper space would argue that being in the right jurisdiction is key, New World Resources managing director and chief executive Mike Haynes among them.

With its principal Antler and Javelin projects located in Arizona, which consistently features near the top of the Fraser Institute rankings, Haynes sees the company benefitting from a jurisdiction marked by excellent security of tenure and support for development. Such nourishing conditions help immeasurably in delivering on New World Resources' two-fold strategy to get into production as soon as possible, while concurrently pursuing additional exploration success to increase the resource base.


View of the anode copper casting and molds in the smelting plant

Yet, the right jurisdiction need not necessarily be one in North America or Australia.

PT Merdeka Copper Gold, for example, is headquartered in Jakarta, Indonesia and explores, extracts, and produces gold, silver, copper, and other minerals through subsidiaries spread across three islands in what is the world's fourth most populous nation and third largest democracy.

Among the several projects the company has in development, its underground Tujuh Bukit copper project stands out, given its credentials as one of the largest undeveloped copper deposits in the world.

With impeccable ESG credentials and a proven pedigree, Merdeka is well placed to become a significant global mining player in facilitating the clean energy transition.

Pipeline of supply challenges

Meanwhile, Global Mining Research estimates that the top 20 copper mines will require US$50bn just to maintain production as reserve grades fall due to high grading. In addition, an ageing copper production asset base is increasingly marked by coveted ore deposits being located at greater depth. And while very modest annual growth in worldwide copper production has been achieved across most of the last decade, this masks a story of marked differences across jurisdictions.

In Chile, for example, where access to water resources is a growing challenge, the world's largest producer of copper has been unable to maintain production levels, with the country's output falling every year since 2018. This is despite it being governed by an administration focused on facilitating an increase in production, and one acutely aware of the degree to which copper exports help to underpin the country's economic health.

Potential supply shocks, such as the 1.5% of volume removed from global copper supply almost overnight following the closure of First Quantum Minerals' Cobre Panama mine, must also be considered as never before. These add to mining companies' cautiousness when it comes to approving new production in any countries where rule of law is not perceived to be sacrosanct.

Cumulatively, the various factors driving lower supply are having an impact on China's growing portfolio of copper smelters, where concentrates are purified into refined copper, which sets the benchmark LME price. While hungry for concentrate, these smelters' appetites are set to be unsated, with the shortage of concentrate to work with likely to persist. In March 2024, there was an unusual joint agreement by Chinese smelters to cut production. Given that, collectively, they are responsible for processing half of the world's mined copper, it acted to set copper prices soaring.

Policy responses

In a commonly expressed series of policy responses to the supply risk and its essential function in energy transition technologies, copper has been designated as a critical raw material across the world.

In the US, for example, the critical materials list informs eligibility for government subsidies under the Biden administration's flagship Inflation Reduction Act, which is designed to strengthen the supply chain for the likes of copper and accelerate the net zero transition. Tax incentives and loan programmes could provide new financing alternatives to the traditional source of mining capital, and act as a stimulus to production.

Despite President Biden's soothing public rhetoric about not wishing the US and China to decouple, but rather to see the two countries' relationship diversified and de-risked, in practice, the US is aware it is in competition with its rival across the Pacific for critical minerals such as copper. And so it is seeking to address its copper supply chain vulnerability beyond its borders as well as within. This has led to the US helping to bankroll the development of a US$2.3 billion railway corridor to transport copper from the Democratic Republic of Congo in Africa's interior to a port in Angola on the continent's western seaboard.

While there is no shortage of copper projects that could be brought online, the average lead time from discovery to first commercial production is 15.7 years, meaning that a sharp increase in demand cannot be met in this way in the near term. And for existing producers, output cannot easily be ramped up in a landscape where inelasticity prevails.

Long-term bull

The supply response needed to begin to meet the anticipated explosion in demand and make the many and growing risks worthwhile must come from a price rise; one that will create an incentive for those development projects currently borderline economic to go from the cusp into production. Beyond this, to create an ongoing pipeline of projects, more risk capital will need to be spent on exploration.

While historically high, prices are yet to constitute sufficient incentive to get miners to invest in new mines, given that project development risks are increasing. Nonetheless, a critical mass of market participants is coming to understand that a material and imminent structural shortage in supply reinforces the long-term bullish view around the red metal, and there are strong reasons to believe that this time copper won't fall back in a hurry, but will instead enter a supply-driven super-cycle.

In terms of risk mitigation, investors can extract some comfort that greater protection from a lithium-style bubble and subsequent price crash is built in with copper, since the demand base is that much broader and its fortunes are not tied in exclusively to the health (or otherwise) of the battery market.

And, while irresistible, the energy transition will take time to gain momentum, as evidenced by the likes of General Motors, Ford and other automakers that have separately

Panoramic view of south central Mumbai at golden hour (dusk)

determined there is insufficient demand at present to justify accelerated investment in and roll out of EVs. Without a more incentivising policy landscape, this could serve to make share price swings slightly less sharp.

That the significantly higher forecasted future demand for copper will be sustained seems likely. This demand will not only be driven by the global energy transition, but also by urbanisation at scale, which is ongoing in China, and rapidly increasing in India, now the world's most populous country.

2024 lift-off

While the copper price had an unremarkable start to 2024, March saw a rise that could be the beginning of a sustained climb. Meanwhile, copper is expected to experience a significant and immediate price boost should potential US Federal Reserve interest rate cuts materialise, which would act to weaken the dollar and make the dollar-priced metal more attractive to foreign buyers. Certainly, the noise from the analyst community around the prospects for the red metal is becoming increasingly loud.

BMI, for example, noted that the copper market is expected to be "in a sustained deficit as the green transition accelerates along with the demand for 'green' metals including copper".

Fast Markets sought to draw attention to the copper market now having "the tightest fundamental outlook of all the base metals in 2024", suggesting a 5% increase in average pricing compared with 2023. Researchers there expect to see a deficit of around 300,000 tonnes of copper concentrate for 2024 overall.

The outlook for the copper market by analysts at Jefferies foresees an accelerated onset of a bullish trend, while analysts at Citi have said that copper's recent break above US$8600/tonne was significant and presented more upside.

For its part, Goldman Sachs assessed that low stock levels and a reduction in both mine production and refined copper output are set to combine, driving the market into a period of much clearer tightening. Analysts there anticipate a considerable deficit of 428,000 tonnes for 2024, a projected increase to US$10,000/tonne by the end of the year and US$12,000/tonne by the end of Q1 2025, on the back of intensifying supply constraints.

Investment bank, UBS made its position abundantly clear in March 2024 when it predicted an "unavoidable" copper supply crunch. In the same month, in response to investor demand and the hubbub around copper, Sprott Asset Management launched an exchange traded fund. This excludes the diversified majors to provide pure-play exposure to large, mid and small-cap copper stocks.

The consensus among the professional price-forecasting community is that supply shortages – in part, driven by high-profile closures – will work in league with greater demand for energy-transition metals to increasingly tighten the copper market through to year-end. These phenomena and emerging tightness are biting about a year ahead of previous forecasts and are acting to catch some investors off guard.

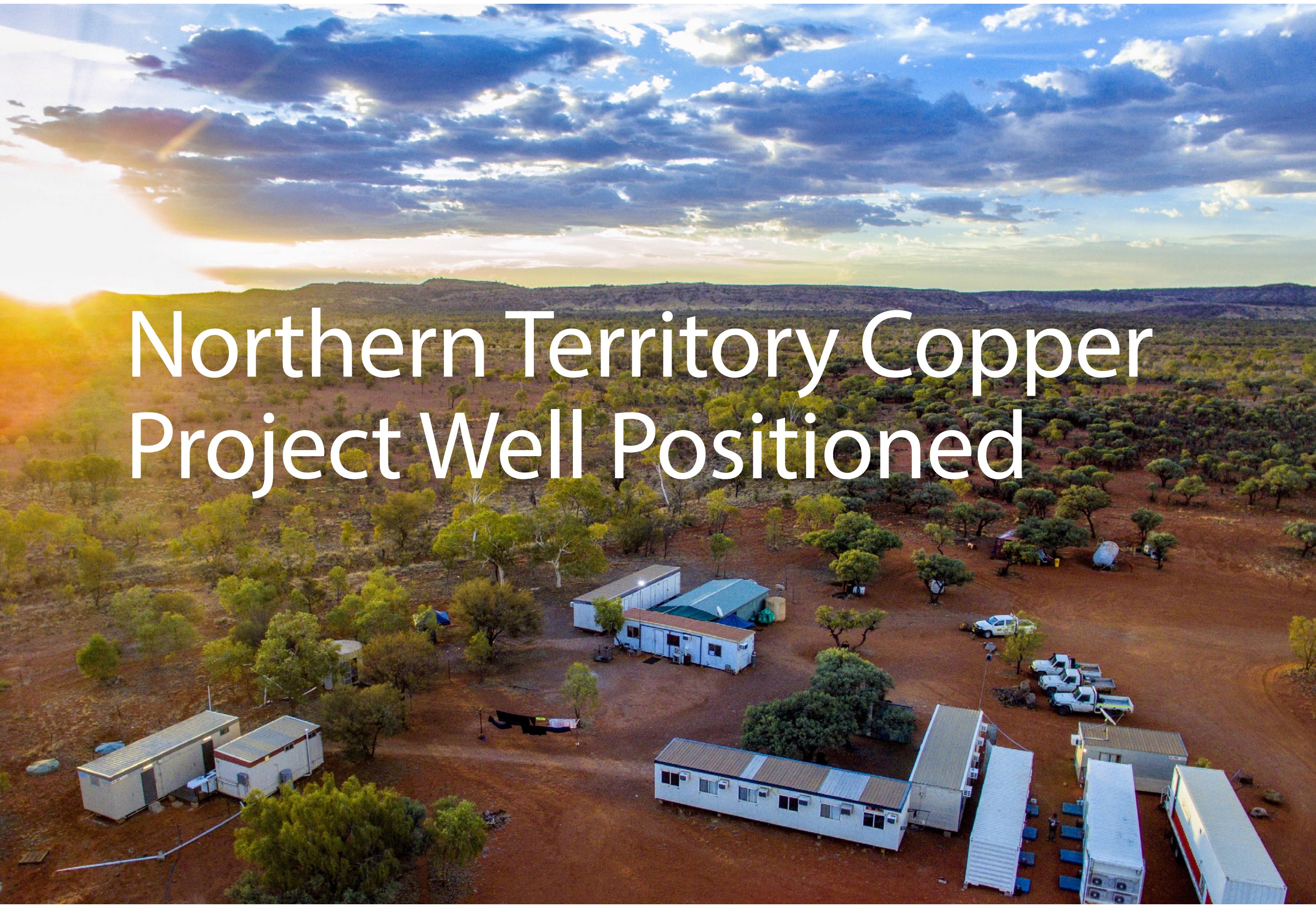
Meanwhile, the commitment by over 60 countries at COP 28 to back a plan to triple global renewable energy capacity by 2030 has also served to reinforce the bullish outlook for copper.

The likelihood then is that the copper price will push through any macroeconomic headwinds to reach record highs in 2025. Well-placed developers are positioning themselves to enter production at the onset of higher prices, while explorers with the best projects can expect investors to come knocking as word gets out.

Copper the unrivalled

In the future, substitutes for copper must be found, given consumption will ultimately be constrained by the finite nature of economically mineable resources, regardless of the stimuli. For now, however, it has no credible challengers for its durability and conductivity, and it must shoulder the burden of responsibility alone as the lynchpin of the energy transition.

Copper's long forecasted time in the market sun appears about ready to arrive as a profound supply deficit and tightening market for this critical decarbonisation commodity starts to take hold. Neither straightforward, inexpensive nor swift solutions to this supply conundrum exist. As such, investors' patience is finally set to be rewarded with the next five to 10 years looking very promising for copper and for those mining companies in the space with something tangible to shout about.



Northern Territory Copper Project Well Positioned

KGL Resources provides compelling investment rationale with its Jervois copper project

Australian mineral explorer and developer, KGL Resources (KGL) is focused on the delineation and development of the high-grade resource at the Jervois copper project in the Northern Territory, Australia, with a view to establishing a high-grade, sustainable copper mine.

Too good to ignore

KGL's rationale for acquiring the Jervois project in 2011 was based firstly on the exciting exploration potential of the Jervois leases given their proximity to the large crustal-scale Jervois Fault, which acted as a plumbing system for mineralizing ore-forming fluids, and the distinctive J-shape of the outcropping mineralised system which extends for a strike length of some 12 km.

In addition, the company's management was of the view that the competitive advantage of Chile's large, low-cost porphyry copper mines was being eroded after 100 years of operations. They believed projects there would increasingly come to experience significant challenges with declining grades and depleted reserves, necessitating a massive increase in capital expenditure levels and operating costs to maintain existing production levels.

The KGL way

To date, KGL's capital management approach to exploration and project development has been marked by a high degree of discipline, and the company has benefited from a stable, patient and supportive long-term shareholder base.

Given the relatively high cost of constructing and operating mines in remote Australian locations such as Jervois, KGL's focus has been on increasing the quality of the project by targeting higher grade mineralisation.

Reasons to be cheerful

The feasibility study of November 2022 confirmed the Jervois project to be technically robust and financially viable with a copper price of US$4.23/lb and supported a high-grade copper mine with production for 11.25 years.

The strong drilling results from KGL's most recent drilling programmes at the Reward and Rockface deposits

Operating drill rigs

continue to demonstrate the strong potential for expansion of the high-grade resource from infill drilling at shallow to intermediate depths, as well as from down hole electromagnetic (DHEM) surveys indicating that both remain open at depth. The results also support a more robust mine plan and the project's economics.

The company is now committed to improving its understanding of the geology, structures and mineralising processes at depth, with ongoing exploration success set to add materially to the value of the project in driving capital efficiencies, cashflow and internal rate of return (IRR) improvement. The more robust market for copper anticipated would also provide KGL with additional production options in the mine plan.

Optimising

For now, given the challenging current market environment, KGL is progressing optimisation studies and risk mitigation strategies to be able to deliver a cost-competitive project on time, when market conditions improve. This has led to a focus on improving key project value drivers including productivity improvements to support project financing.

Highlights include proposed process plant configuration enhancements that would reduce the amount of labour required on-site for construction and act to increase the annual processing rate from 1.6Mtpa to 2.0Mtpa. It has been determined the plant will utilise a conventional crushing, semi-autogenous grinding (SAG) and ball mill comminution circuit and energy efficient Jameson Cell technology in the flotation circuit.

Once the key assumptions and results of the optimised feasibility study are updated, KGL intends to proceed with a pre-construction phase to initially support an expanded drilling campaign.

Once financial closure is achieved on the basis that the requisite conditions to support a sustainable project are met, long lead items can be ordered. It is estimated the construction period will take 12-18 months, followed by commissioning and production ramp-up over a six-month period.

Undervalued

Analysts are forecasting a structural deficit in the copper market of up to 10Mt by 2035.

Drill core

KGL Resources currently has a market capitalisation of A$68 million (at A12c). Given copper's buoyant prospects and the significant progress KGL has made moving the project along the development pathway, many would argue the company's share price does not reflect the inherent value of its high-grade copper project.

Fertile geopolitical and macro environment

The IEA estimates the world will need 700Mt of copper over the next 20 years to meet its Paris Agreement climate goals. Currently, however, 60% of copper production is concentrated within just five countries (Chile, Peru, China, Democratic Republic of the Congo, and the US), where a range of potential supply chain disruptions exists: political risk, military conflict, violent unrest, paucity of labour and anti-competitive behaviours, alongside the risk of export bans to promote use by domestic industries.

With chronic shortfalls in copper forecast over the next decade and challenges in supply from the traditional Latin American low-cost markets, Australia is well placed to take advantage. Blessed with the world's second largest reserves of copper, it has scope to significantly grow its critical minerals wealth and become an important player in developing secure, reliable and sustainable global supply chains for copper that are internationally competitive. The Jervois copper project is well positioned to be a part of that shift, which is set to cause Australia's global market share to rise from the current figure of just 4%.

Many states and territories in Australia, including the Northern Territory, have now recognised copper as a critical mineral, with the Australian federal government recently announcing that copper is to be included on the newly created Strategic Materials List. This creates a nourishing investment environment for companies like KGL Resources.

The company's market appeal is clear: KGL Resources has a high-grade copper project located in a tier one jurisdiction, and is well positioned with all major approvals to bring Jervois into production when market conditions are supportive. It is highly leveraged to expected increases in copper prices, and has significant exploration upside potential.

In the meantime, the company continues to progress the Jervois project along the development pathway towards final investment decision (FID) and financing.

KGL Resources – at a glance

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Market Capitalisation
A$68.07 million (as of March 26 2024)

Quoted shares on issue
567 million

Major Shareholders
KMP Investments PTE LTD (Salim Group) - 28.70%
Mr Denis Leslie Wood & Mrs Anne Wood - 10.15%
Marshall Plenty Investments - 7.98%

Merdeka's Tujuh Bukit – Major Copper-Gold Project Underway

Merdeka Copper Gold is an established Indonesian mining company headquartered in Jakarta, currently advancing three tier one mining assets in gold, copper-gold, and nickel.

It explores, extracts and produces through subsidiaries spread across three islands in the Indonesian archipelago.

Among the projects the company has in development, its underground Tujuh Bukit copper project stands out, given its credentials as one of the largest pre-production copper-gold deposits in the world.

With a proven pedigree of value creation, alongside multiple transformational growth projects, strong Indonesian shareholder support and solid ESG credentials, Merdeka is well placed to become a significant global mining player supplying the metals increasingly in demand for the clean energy transition.

Low-cost, long-life, cycle-proof

The 100% Merdeka-owned Tujuh Bukit project in Banyuwangi, East Java, is now completing optimisation studies. These studies include the potential for improved metallurgical recoveries, higher underground production throughput, and open-pit mining of additional copper ore. The two statistical highlights include approximately 200,000t/a of peak copper equivalent production and an estimated mine life of greater than 30 years.

Significantly, the Tujuh Bukit copper project is located beneath Merdeka's Tujuh Bukit gold mine, an existing, profitable operation where Merdeka receives strong community and government support. The gold mining infrastructure and associated support facilities provide a valuable platform for the underground copper-gold project to leverage. Anticipated as a low-cost, long-life operation, the copper-gold project points to being cycle-proof and compares favourably to peer sublevel caving (SLC) and block caving operations.

Since 2018, Merdeka has invested more than US$200 million directly into specific development and feasibility


The Tujuh Bukit Copper Project workers drilled and took rock samples for analysis. Photo- Anggung Setiawan BSI

work on the project in close concert with renowned technical consultants, including Stantec, DRA Global, Hatch and WSP (Golder). This activity includes a 1890m long exploration decline and over 150,000m of resource definition drilling, as well as extensive independent studies on mine design, mineral processing and surface infrastructure.

The mining lease contains multiple mineralised copper-gold porphyry deposits with the potential to further enhance the existing multi-decade mine life. At the same time, Merdeka has also identified several untapped optimisation opportunities that need to be accounted for in the May 2023 prefeasibility study project economics. The lease further demonstrates the potential for additional gold indications alongside the copper-gold porphyry deposits.

State of play

As of March 2024, the latest mineral resource estimate from the project reported an increase in the indicated category for the Tujuh Bukit copper project to 8.2Mt of copper and 27.9Moz of gold. The significance of this is that most of the planned SLC area where ore grades are greater than 1% copper and 1g/t gold, has now fallen within the indicated resource, making further drilling unnecessary since the 2022 drilling program has delivered its objectives.

This means drilling plans for 2024 need only be from the surface, with the focus on confirming additional heap leachable gold-silver oxide resources and identifying open-pitable copper-gold sulphide resources to accelerate and de-risk the early production profile of the copper-gold project. This strategy will supplement the SLC ore with open-pit ore if ongoing studies and plans indicate this is feasible.

Financing

Director and executive chairman Andrew Starkey characterised the gold aspect of Tujuh Bukit as providing capital to investigate and assess the copper-gold project below to get the site moving. Since achieving its first gold pour in March 2017, the Tujuh Bukit gold mine has produced and sold over 1Mozof gold with a low operating cost base.

Full year gold production for 2023 was 138,666oz at a total cash cost of $842/oz and an average sales price of $1939/oz. Guidance for 2024 is 100,000 to 120,000 ounces of gold at a total cash cost of $900 to 1,050/oz.

Starkey explained that "the focus has always been on how we best monetise the copper-gold porphyry project that sits immediately below the gold mine. The optimisation studies are planned to continue through 2024, and during this period the development financing plan for the project will be finalised."

In terms of progressing the financing plan, he noted the inbound strategic interest in the asset and the favourable support from Merdeka's banking partners. He also drew attention to the major shareholders' track record in financing and developing multiple large-scale projects in Indonesia.

Safe and secure

Indonesia has consistently viewed mining as a key driver of gross domestic product, regardless of the presiding administration. Moreover, Merdeka is Indonesia listed, has majority Indonesian shareholders, and is regarded as an Indonesian company by all stakeholders. Therefore, it is well placed to avoid the issues foreign mining companies may encounter when operating outside their home jurisdiction.

In terms of progressing the Tujuh Bukit copper project in response to continued inbound strategic interest, Merdeka intends to begin a partnering and funding process designed to unlock the full value of the mine through a phased approach.

The project's inherent credentials have gone relatively unnoticed to date by investors. This is partly due to its anomalous state, whereby there are few comparable base or precious metal listings in Indonesia, meaning analysts have little to compare it to.

Indonesia has been a model of political stability in the region for several years. With its mining-focused national agenda and advantageous operating cost environment, it should be considered a highly attractive investment destination. Investors in locations such as China, Taiwan, Korea and Japan have understood this at scale for some time.

Globally significant asset

The key differentiators of the Tujuh Bukit copper project are:

- Globally significant deposit containing 8.2Mt of copper and 27.9Mozof gold;
- Positioned to be a large-scale, long-life and low-cost operation;
- Enjoys strong community and government support, extended from the gold to the copper-gold project;
- Its brownfield status provides a clear and rapid development path;
- Initial government approvals received and clear permitting strategy in progress; and
- Experienced board and management team with a proven track record of creating value, supported by committed Indonesian shareholders.

When fully ramped up, it is set to be one of the few new near-term producing, tier one copper-gold operations held 100% by an independent company.

With optimisation studies on track to be completed by early 2025, the project is scheduled to start full-scale development during that same year. One of the areas being studied is a material reduction in capital expenditure, which highlights a potential path to first production requiring substantially less than the US$750 million estimated in the previously released prefeasibility information.

With the red metal's unique energy transition credentials, the pronounced increase in appetite for it is already seeing the copper price head northwards. Increasing gold prices further reinforce the economics of the Tujuh Bukit copper project. Importantly, however, it is not reliant on a sustained increase in either to go into production.

ESG

Merdeka is committed to integrating sustainability into all aspects of the business, as evidenced by its environmental, social and corporate governance Morgan Stanley Capital International (MSCI) rating. This was upgraded from 'BBB' to 'A' in October 2023, cementing Merdeka's position as the only mining company in Indonesia in the MSCI Diversified Metals and Mining category to receive such an accolade. Merdeka is committed to aligning with sustainability thresholds that prevail in jurisdictions where compliance criteria are more exacting.

Pedigree and progress

The Merdeka Group is well diversified across a portfolio of businesses, with the Tujuh Bukit copper project set to be the fourth large-scale mining project it has brought into production. It has not been subject to the stop-start capital raising experience that marks many other copper projects in development. Instead, progress to date has been informed by study work, technical considerations and construction timelines, and this is set to continue as the project advances towards production.

Medeka – at a glance

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Directors:
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Market Capitalisation
$US3.6 Billion (as of April 5 2024)

Quoted shares on issue
24.4 billion (as of April 5 2024)

Major Shareholders
PT SARATOGA INVESTAMA SEDAYA TBK 18.45%
PT Provident Capital Indonesia 12.06%
Garibaldi Thohir 7.358%
PT Suwana Arta Mandiri 5.588%
CONTEMPORARY AMPEREX TECHNOLOGY CO., LIMITED 5.00%

Unique Project in Chile's Emerging Copper Belt

Marimaca's low-risk, low-cost green-copper project advancing towards near-term production.

TSX-listed Marimaca Copper's 100%-owned project of the same name in Antofagasta, Chile is advancing towards production of high-quality copper cathode at a rapid pace.

The company is currently focused on delivering a definitive feasibility study for late 2024, with president and chief executive, Hayden Locke and his team "targeting the 50,000 tonnes per annum mark".

Since it was originally discovered in 2016, Marimaca has built up a land package in the region of 66,000ha and completed over 120,000m of drilling.

Marimaca presdient and chief executive Hayden Locke

ESG star in the making

The project is envisaged as a sustainable green-copper mine that will use recycled water from the nearby Bay of Mejillones and be powered by renewable energy. Carbon impacts will be further reduced through the application of


Marimaca Project

heap leaching processing methods, while there will also be very minimal impact on biodiversity, given the project's location in Chile's arid Atacama coastal desert region.

A low strip ratio means less diesel per tonne of material needing to be moved to get the copper to the back end of the project, and an SXEW processing method means the smelting and refining of copper concentrates stage is skipped, so lowering the overall carbon intensity. In addition, with most of the project land government-owned or controlled, the potential for conflict or need for negotiations with other land users is much diminished.

The Antofagasta region is set up for mining and offers ready access to key infrastructure, translating to a strong execution risk profile for the project. Specifically, the conurbations of Mejillones and Antofagasta are just 25km and 40km distant respectively, meaning paved road access to a rich reservoir of skilled labour and no requirement for a project camp to house the workforce. Mejillones is one of the largest mining support ports in Chile and responsible for significant sulphuric acid imports, as well as exports of copper cathode and concentrate from mines nearby.

Importantly, the town is also blessed with several permitted seawater intake systems used for cooling by its power plants. This has given rise to an option agreement for Marimaca to secure future seawater supply, further elevating the project's ESG credentials in a region where freshwater is a precious commodity.

Extended mine life potential

Marimaca is primarily an iron oxide copper gold (IOCG)-type deposit, which is unusual for the Chilean Coastal Cordillera where it is hosted. And an IOCG deposit of this scale is highly anomalous, such that the project can be considered a truly ground-breaking endeavour.

The company's regional exploration strategy for 2024 is informed by a comprehensive review and reinterpretation of historical geological information and will lead to it further exploring the discovery potential of the Sierra de Medina property block, which, along with satellite discoveries made in 2021, is serving to reignite the exploration pipeline and provide credible optionality for an extended mine life from 14-16 years to 20-25 years.

Sierra de Medina is located some 25km from the primary Marimaca Oxide deposit, which is continuing to advance towards production in strategic partnership with cornerstone long-term investor Mitsubishi Corporation and has multi-national engineering firm, Ausenco leading its definitive feasibility study (DFS).

Alluring economics

Locke characterised the cost and execution risk of Marimaca as low, with the project marked by industry-leading CapEx and manageable OpEx.

He explained that the expectation for Marimaca is that it will be no more than $10,000/tonne in respect of capital intensity, which makes for good reading. This is largely down to the fact that it is at a low elevation on the coastal belt and not in the higher cost high Andes, a location that demands larger scale projects to hit the necessary economic thresholds.

The company is fully financed for all permitting and DFS requirements, with Locke describing the project as "incredibly robust".

By way of evidence, he pointed to preliminary economic assessment downside scenarios that were run based on copper at $2.50/lb, which still delivered an internal rate of return of 20%, a figure the president and chief executive described as "remarkable".

Informed by such downside protection, Locke is confident on the financing aspect. Further to the DFS, the intention is that the next phase of capital costs will "take us into further de-risking, detailed design and engineering, infill drilling, and potentially a pilot plant", he explained.

This tightening up of DFS estimates will allow for momentum to be continued towards a final investment decision .

Copper/Chile pedigree

In respect of management capabilities and the provision of reassurance that Marimaca has both copper and Chile pedigree to see the project to fruition, the company has the key building blocks in place.

The board makeup includes Clive Newall, one of the founders of Canadian copper giant, First Quantum Minerals, while vice president of projects is Leonardo Hermosilla who has over three decades of experience in mine development and construction in Chile.

Don't believe the hype

Locke views Chile as an "amazing jurisdiction", an assessment backed up by Mining Journal's investment risk index which awards it 'BBB', making this well-established tier one location number one in Latin America.

He is also sanguine regarding concerns about the current Chile Government's much publicised rhetoric around nationalisation and higher taxes in pursuit of a greater share of the mining pie. The Gabriel Boric-headed administration's vote-winning oratory not amounted to anything substantial to date that could provide cause for concern.

Moreover, regardless of political stripes, all parties share an understanding of the importance of mining as a driver of socio-economic development in Chile, and that it would be self-defeating to turn the screw on foreign investment in such a way that plugs were pulled on projects at scale. In addition, as within all mining countries, prevailing forces differ region by region. For its part, Marimaca benefits from being in Antofagasta, the largest copper-producing province in the world's largest copper-producing country.

That said, Locke is cognisant of the need to engage early and proactively with both politicians and what is a highly unionised workforce to ensure win-win outcomes, and so the company prioritises transparency in a jurisdiction that values and demands it.

Copper inherently strong

As to wider forces at play, Locke is a firm believer in the copper price rise to come, and that higher prices will sustain in the medium to long term. That the increase has taken longer than anticipated to start he puts down to the global macroeconomic climate.

The chief executive believes the copper price narrative is driven by significant underinvestment in supply and a lack of new discoveries. And he considers the fact that copper has held its price – rather than plummeted like some other metals in the face of the global economic malaise – is a testament to this profound supply side story.

The Marimaca Copper Project is one of the only globally significant copper discoveries made in the last ten years and comes replete with substantial exploration potential. It has already been considerably de-risked, with the management team now focused on permitting, delivering the DFS, and bringing together the right team. As it moves the project forward in the best risk-adjusted manner, it remains on track for production in 2028.

Marimaca – at a glance

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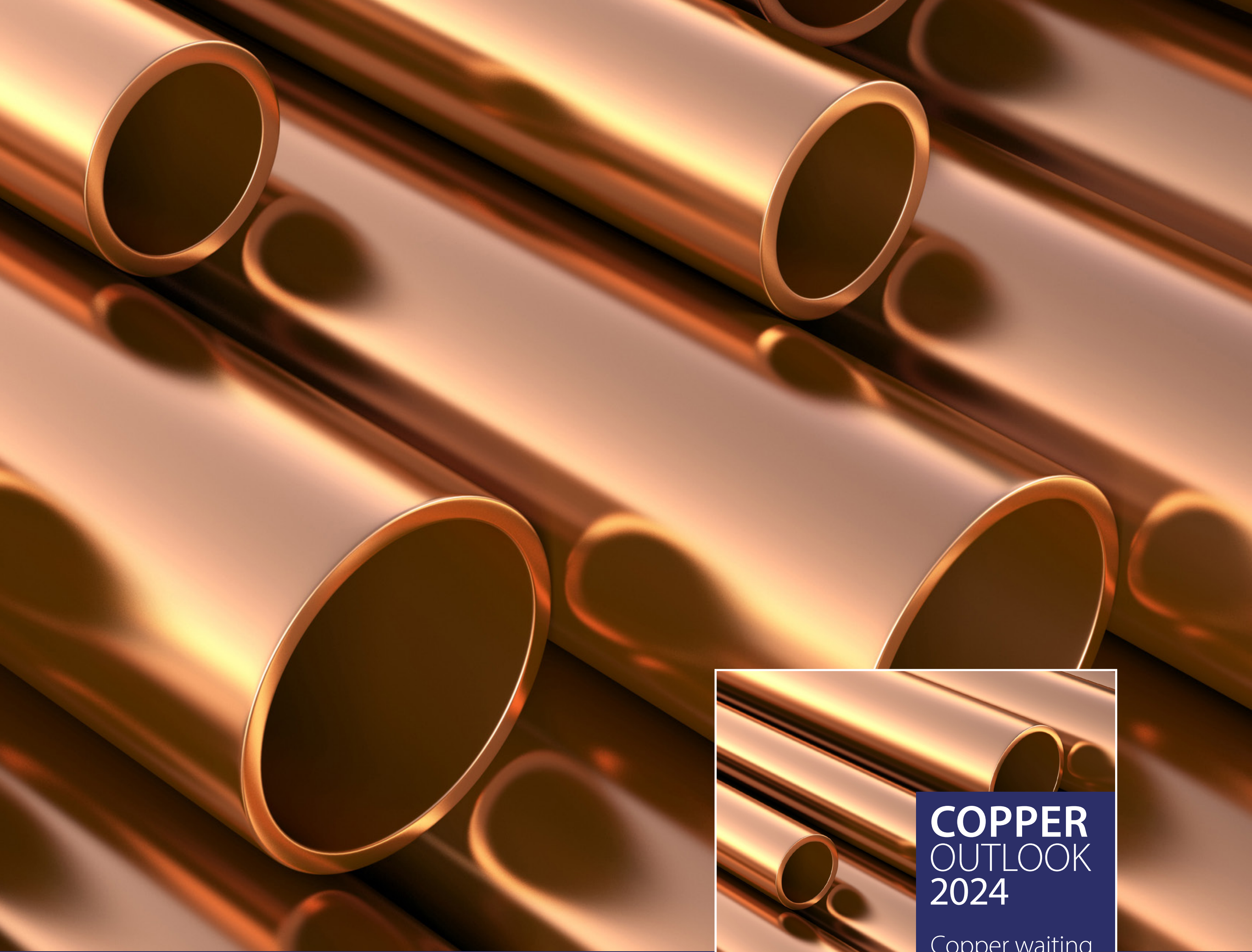
Market Capitalisation
C$288 million

Quoted shares on issue
93,241,923 (as of April 2 2024)

Major Shareholders
Greenstone 27.4%
Tembo 10.9%
Mitsubishi Corp. 5.0%



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