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Dear Readers,

As Gabriel Boric's administration approaches its end in late 2025, the past 12 months have given the Chilean mining industry time to reflect on a tumultuous four years. Regulatory changes and uncertainty about mining's role in the national plan have made the post-pandemic era unpredictable and concerning. However, mining did what it does best: adapt and survive. With much of the constitutional and administrative reform completed, 2024 and 2025 were years of recovery and resilience for Chile's largest industry.

As the dust settles, the world's top copper producer is poised to benefit significantly from record-high prices, with most analysts predicting that this is just the beginning. This optimism is reflected in the US$83.1 billion that both public and private companies plan to invest in Chile between now and 2033 to ramp up, expand, and improve their operations, demonstrating the confidence the world's largest mining players have in the South American mining giant. Additionally, the government has increased its focus on the lithium sector, offering Special Lithium Operation Contracts (CEOLs) to help speed up the permitting process and bring more lithium production to the world's second-largest producer of the critical mineral.

The Government's support for mining has been widely praised throughout Chile's extensive mining ecosystem. The country's value chain is preparing for a mining boom over the next decade, exploring new technologies, becoming more environmentally friendly, and expanding its services to support mining companies in future projects. Additionally, as neighboring countries like Argentina, Ecuador and Peru also aim to capitalize on high commodity prices, Chilean companies have the chance to expand their decades of expertise internationally, with many new opportunities in Latin America on the horizon.

GBR's Chile Mining 2025 explores the trends shaping the industry, featuring interviews with over 130 executives, government officials and industry leaders. We thank all participants for sharing their insights, with special thanks to Consejo Minero and APRIMIN for their continued partnership and support.

Alfonso Tejerina
Director and General Manager
Global Business Reports (GBR)

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Introduction to Chile

Mineral Production

Exploration

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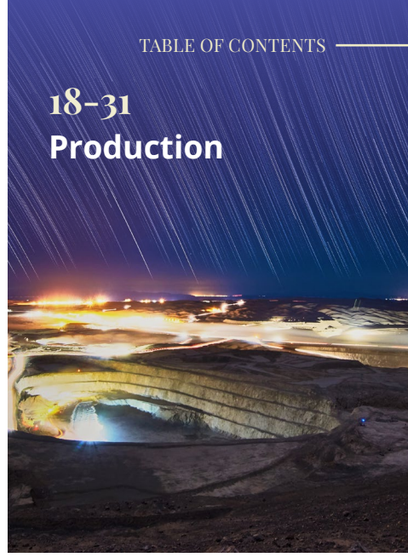
Services



INTRODUCTION

“With the global transition to clean energy, the scarcity of copper will become even more critical, while aging deposits, environmental regulations and supply chain issues also contribute to stressing inventories. Chile has the opportunity to boost production.”

Andrés Souper
General Manager
GLENCORE CHILE

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Resilient and Rising

Chile's mining sector gets back on track

After several years of challenges and uncertainty, the resilience of Chile's mining industry shines through in 2025. The path to foreign investment is more competitive than ever, and companies across the value chain are trying to break the downward trend of decreasing production levels that have plagued Chile since 2019. The annual total for copper production in 2024 was 5.5 million t, an increase of 4.9% from 2023's figure. As the country emerges from the recent experiences of regulatory changes and an unsettled political attitude toward mining, it seems the world's leading copper producer is back to its brightest. Furthermore, with an election on the horizon in November 2025, companies remain cautiously optimistic about the future of mining in Chile.

In December 2024, the Government of Chile began devising the National Critical Minerals Strategy, in addition to the National Lithium Strategy, to seek environmental and social balance whilst streamlining the permitting process to develop more mines and thus increasing production once again. Aurora Williams, Minister of Mines, revealed: "We project that the strategy will be released in the next few months, built with information from various sources, including 16 key actors in mining from institutions such as Sernageomin and Cochilco, the private sector, and academia. The strategy will have a broad focus, including the redistribution of money to affected territories and how we can help increase the production of critical minerals in Chile."

The Ministry of Mining, under the leadership of Minister Williams, has also committed to reducing the permitting time by 30%, as well as evaluating how other government agencies, such as CORFO, can add value to the country's mining sector.

As part of the National Critical Minerals Strategy, the Government is looking to map Chile's entire geology to equip exploration companies with better data, with companies required to report all exploration findings to the National Geological Survey. Another entity aiming to aid in exploration activity is the Chilean Mining Chamber. "One of our key initiatives is the National Geological Exploration Plan, developed in collaboration with the College of Geologists, which aims to map Chile's mineral resources region by region. This US$4 million project, expected to last 24 to 36 months, will create jobs for geologists, engineers, environmental specialists, and archaeologists, while providing crucial data on Chile's mineral wealth to guide future mining investments," said the Chamber's president, Manuel Viera Flores.

Cochilco (the Chilean Copper Commission) reported a monthly production of 563,400 t of copper in December 2024, the highest in Chile's history and 14.1% higher than December 2023. The executive vice president of Cochilco, Claudia Rodríguez, emphasized: "The most significant trend revealed in this report is that as a country, we have moved past the downward trend in production figures and are beginning to witness a rise once again. Chile will also increase its share in global production to approximately 27.3% by 2033."

The first months of 2025 have seen a surge in demand for copper, and this has been reflected in a price hike of 11.44%. Analysts attribute this to a weakening US dollar, geopolitical tensions, rising industrial demand, and the tariffs imposed by the US government, as well as the ongoing global shift toward renewable energy and electric vehicles. However, copper price outlooks remain cautious for the foreseeable future, owing to geopolitical tensions and the ensuing supply chain challenges.

US President Trump has threatened a 25% tariff on all copper imports to the US, sinking the price by up to 7.7% on the London Metals Exchange. More uncertainty is affecting the short-term attitude of investors and buyers. Claudia Rodriguez explained: "Copper is currently being investigated by the Department of Commerce in the US, which is causing volatility in markets that are concerned about whether tariffs will be imposed or not. However, demand for copper has continued to grow, and investments are beginning to materialize, leading to our confidence in the copper price moving forward. If anything, geopolitical tensions position Chile well to increase its leadership in copper production."

Uncertainty surrounding international trade and increased protectionism from foreign governments could create opportunities to step up and collaborate to meet the rising demand for copper. "Chile is a globalized country, whereby we have 34 free trade agreements covering 65 economies that represent 66% of the world's population and 88% of the global GDP," outlined Minister Williams.

Working to promote the interests of Chile's service providers, APRIMIN president Dominique Viera suggests geopolitical tensions and the potential of foreign trade wars present an opportunity to the service and supply sectors: "Global supply chain disruptions have also triggered strategic reconsideration. Companies are now exploring nearshoring to reduce exposure to distant suppliers, a lesson reinforced during the pandemic. These trends are pushing us to rethink how and where we source equipment and services."

Working together toward a mining boom

Chile is the leading mining country amidst growing local rivals. "Collaboration is key. The world needs copper, lithium, and other critical minerals, and Latin America has them. Chile has a long history of mining and has developed a lot of expertise, especially in areas like safety and sustainability. We can share those best practices with our neighbors. At the same time, we can learn from the innovations happening in other countries. Peru, for example, has newer mines and is facing different challenges, which have led to some interesting solutions," exemplified Carlos Carmona, vice president of Netmin, which hosts a mining industry web portal.

Carlos Parada, president of the organization, added: "There is already a degree of collaboration happening organically through the multinational companies operating in the region. These companies tend to standardize their practices and share knowledge across their different operations. However, we need to go further. We need more direct collaboration between countries, particularly in areas like logistics and infrastructure."

Neighboring countries like Argentina, Peru, and Ecuador are all working to advance their mining industries. "Chile already has a treaty with Argentina to support binational mining projects and is engaged in initiatives with Brazil and Paraguay to develop infrastructure corridors, such as an oceanic corridor that would connect regions across the continent," discussed Joaquin Villarino, president of Consejo Minero, continuing: "From my perspective, mining growth in neighboring countries does not pose a threat to Chile but rather presents an opportunity. It enables Chile to export mining rather than only minerals; knowledge, mining services, and technical expertise to countries that may have resources but lack deep mining experience."

Similarly, members of APRIMIN will be looking to expand beyond Chile with the growth of mining in surrounding countries, becoming regional leaders in mining services and products. "As other countries like Argentina, Ecuador and Colombia expand their industries, our suppliers have the opportunity to export expertise and services. This is not competition but regional collaboration. We want a strong neighborhood, and the growing demand for critical minerals makes room for everyone," outlined Dominique Viera, APRIMIN's president.

Experts predict that demand for copper may grow by 27% before the end of the decade, with AI data centers, renewable solutions, and the EV market requiring 36.6 million t/y of the group 11 metal before 2031, according to McKinsey. "Two-thirds of the copper produced in Chile is from private companies, exemplifying the necessity of foreign investments. In this regard, we count on InvestChile, a specialized body in charge of attracting investment and making sure that Chile can handle such figures in terms of infrastructure and personnel," elaborated Minister Williams, demonstrating how Chile is preparing itself for such investments.

In Chile, copper production is expected to increase to 5.54 million t/y by 2034, peaking at 6.07 million t in 2027. This increase can be attributed to the US$83.1 billion of private investment into Chile that has been announced by mining companies over the last couple of years, and bolstered by an announcement of US$13 billion worth of investment by BHP in March 2025, spread across their three Chilean assets. "Of the 51 projects in the pipeline, there are 17 in execution. The base and probable projects are those that have their environmental resolutions approved, which is 58% of the total investment figure. This investment represents the highest in Chile in the last 10 years," continued Claudia Rodríguez of Cochilco.

In November, Chile will head to the polls to vote for a new President. Much of the talk of the mining industry has revolved around what the attitude of a new government might be as relates to mining.

Consejo Minero believes that an urgent priority should be reforming the permitting system in Chile, which has often been criticized as a lengthy and cumbersome process that hinders investment and project development. "The most urgent priority is addressing the permitting system, a need that is already widely recognized across the political spectrum. There is a consensus that permitting delays hinders development across sectors, not just for the mining industry. We value the government's efforts in conducting reforms such as the sectoral permitting bill led by the Ministry of Economy and the Agency for the Quality of Public Policy, to streamline processes while maintaining high social and environmental standards," highlighted Joaquin Villarino, president of the Council.

The last 12 months have been some of the most stable in the recent history of Chile's illustrious mining history, with constitutional discussions and fears of an overly harsh royalty bill coming to an end. The large investment portfolio set to enter Chile over the next decade has given opportunities for companies across the value chain to benefit, as copper and lithium demand rise in accordance with the need for an electrified and decarbonized world. Chile's mining industry has proven its ability to weather political and economic storms, and now it is time to reap the benefits. ■

Image courtesy of Marimaca Copper

Aurora Williams

Minister of Mining

GOVERNMENT OF CHILE

> It will be a great task to carry out and implement the National Critical Minerals Strategy and collaborate to obtain the legalities needed to accelerate investment projects in Chile.

What have been the main achievements of the Ministry of Mining in the last 12 months?
The Ministry is currently working on a National Lithium Strategy, looking over broad areas of action of the sector to seek environmental and social balance. The strategy not only explores developing more mines, but also studying wages and how we can add value through institutions like CORFO.

Another important pillar of the government's focus has been committing to a reduction of permitting times by 30%, focused on the time it takes for us to evaluate projects. I would like to highlight our efforts to build a National Critical Minerals Strategy and establish our sectoral plan for climate change, demonstrating the wide range of issues the Ministry of Mining has dealt with over the past year.

How do you plan to balance faster permitting times with environmental responsibility?
One of the most important things to me is that all the minerals produced in Chile are done so in a responsible manner. We have high environmental standards, but there is always room for improvement alongside a commitment from a societal perspective. The Ministry is looking for balance within the strategy to consider all stakeholders' points of view. Currently, we are working on a bill in Parliament that will allow us to be more efficient without compromising environmental or social objectives.

In parallel with this legal modification, the Government is supportive of investment and employment, meaning we are working to approve as many projects as make sense. From our inauguration to present, we have approved 76% of projects, with the majority of mines in development today a result of our pro-business stance.

The Government is also ensuring social responsibility, through enforcing the Royalty Law, which is distributing CLP$440 billion to all regions of the country, and now this includes money from mining operations in the local area.

What can we expect from the upcoming National Critical Minerals Strategy?
We project that the strategy will be released in the next four months, with a strategy built with information from various sources, including 16 key actors in mining from institutions such as Sernageomin and Cochilco, the private sector and academia. The strategy will have a broad focus, including the redistribution of money to affected territories and how we can help increase the production of critical minerals in Chile.

How does the Ministry foster public-private relations through the National Lithium Strategy?
Chile has developed its mining industry with the three key pillars of public companies, private companies, and small and medium-sized mining companies. For us, through the National Lithium Strategy, we must see all three of these aspects working together. An example of this is the alliance of Codelco and SQM. Through the six new salt flats we have opened to the private sector, we are hoping to see more examples of public-private alliances.

What is the position of the Ministry of Mining regarding foreign investment entering mining?
Fortunately, Chile is a globalized country, whereby we have 34 free trade agreements covering 65 economies that represent 66% of the world's population and 88% of the global GDP. Two-thirds of the copper produced in Chile is from private companies, exemplifying the necessary nature of such investments. In this light, we work with InvestChile, a specialized body in charge of attracting investment, on making sure that Chile can handle such figures in terms of infrastructure and personnel.

Recently, the President visited India, where their government showed particular interest in Chilean mining. India is an interesting market for us due to free trade treaties and their compliance with many of the standards we have in place here.

Can you outline the plans of the Ministry over the next year?
It will be a great task to carry out and implement the National Critical Minerals Strategy and collaborate to obtain the legalities needed to accelerate investment projects in Chile. As well as this, we will be looking to implement legislation to aid smaller mining operations in the country. We do not doubt that this government will be able to aid and facilitate the US$83 billion of projected investment, the largest in over a decade. It is because of this we are pushing forward with several new initiatives. ■

Joaquín Villarino

Executive President

CONSEJO MINERO

> Mining is now one of the most respected and best-evaluated sectors in Chile, with consistently high levels of public trust, as indicated in various local, regional and global surveys.

What have been Consejo Minero and the Chilean Mining Industry's most significant achievements in the past 12 months?
Over the past year, Chile's mining industry experienced notable performance improvements, and there was an overall positive environment for the development of our activity. In 2024, copper production in Chile increased by 4.9%, and due to favorable copper prices, mineral exports reached nearly US$57 billion. This figure represented 57% of the country's total exports, reflecting the central role of mining in the national economy.

In this scenario, Consejo Minero advanced public engagement efforts to improve the visibility and understanding of mining. Mining is now one of the most respected and best-evaluated sectors in Chile, with consistently high levels of public trust, as indicated in various local, regional and global surveys. This growth in the perception of our industry is in part thanks to more open communications from the entire mining ecosystem, to which we have contributed with direct communications but also through our participation in Compromiso Minero, of which we are founding members, as well as supported by a growing regional presence of our association.

How is Consejo Minero addressing the growing competitiveness of countries like Argentina, Peru and Ecuador?
Compared to peer countries, Chile's permitting process remains cumbersome and slow, but there are initiatives underway to tackle this. Similarly, there is room to improve in labor productivity based on comparative studies. We are working constructively with public institutions to improve Chile's performance on this challenge, mainly through the Mining Skills Council, to better align workforce skills with industry needs.

What role is Consejo Minero playing in lithium policy?
Chile has tremendous potential in lithium, but we need to move faster. The council's efforts are focused on building trust among investors and highlighting the strengths of the Chilean regulatory framework.

The council also underscores the need for the state to accelerate decision-making in lithium-related matters. There have been important developments, such as the partnership between Codelco and SQM, and pending decisions from ENAMI on project offers. With SQM joining Consejo Minero last year, the council has strengthened its engagement with the lithium sector and continues to support collaboration between public and private actors.

Is there potential for regional mining collaboration in Latin America?
Chile already has a treaty with Argentina to support binational mining projects and is engaged in initiatives with Brazil and Paraguay to develop infrastructure corridors, such as an oceanic corridor that would connect regions across the continent. Mining growth in neighboring countries does not pose a threat to Chile but rather presents an opportunity. It enables Chile to export mining rather than only minerals; knowledge, mining services, and technical expertise to countries that may have resources but lack deep mining experience.

Chile's mature mining ecosystem, including service providers, engineering firms and trained labor, can be a valuable resource for regional partners. I participated in recent discussions with Latin American development banks and industry associations focused on building a more integrated mining industry across the region.

What should the next Chilean government prioritize to maintain mining leadership?
The most urgent priority is addressing the permitting system, a need that is already widely recognized across the political spectrum. We value the government's efforts in conducting reforms such as the sectoral permitting bill led by the Ministry of Economy and the Agency for the Quality of Public Policy, to streamline processes while maintaining high social and environmental standards.

Chile holds over US$50 billion in mining projects either under construction or in the pipeline. The economic benefits are significant but delays due to inefficient regulation pose real risks.

What are Consejo Minero's strategic plans for the coming year?
Communicating the sector's contributions and best practices remains a top priority, both to the general public and within decision-making spaces. We will stay actively involved in the private and public sector's discussions, providing evidence-based arguments to support and shape policies that enable sustainable mining development. And related to this, we will continue contributing to the government-led process of defining a national policy on critical minerals, where Consejo Minero has been invited to participate, necessary to secure Chile's position as the leading minerals supplier of the world. ■

Dominique Viera

President

ASSOCIATION OF INDUSTRIAL MINING SUPPLIERS (APRIMIN)

> As other countries like Argentina, Ecuador and Colombia expand their industries, our suppliers have the opportunity to export expertise and services.

Could you provide an overview of APRIMIN's key achievements and initiatives for 2025?
At the beginning of 2024, I set a clear objective to position our organization at the decision-making tables that shape industry policy and the future of the mining industry. I wanted to highlight the strategic role of suppliers in employment generation, regional economic presence, innovation, and even investment. I believe we achieved a key milestone by securing APRIMIN's place in ministerial-level discussions on safety, labor and productivity policies.

We also made progress in productivity. For instance, we signed an agreement with 14 mining companies to standardize entry requirements to worksites. This did not mean lowering safety standards but aligning them, resulting in significant cost savings for contractors. In another collaboration with the Ministries of Labor and Economy, we helped launch a digital platform that reduced the average approval time for exceptional shift schedules. These improvements directly benefit supplier companies and cascade through the mining value chain.

How can the mining sector in Chile ensure a strong and qualified future workforce?
First, I believe we must make the role of suppliers more visible. Today, three out of four mining jobs are in service companies. With the rise of integrated operation centers, many roles are now remote. Therefore, we need to reframe mining as a sector of high-quality employment with broad career paths. Second, I believe we need a strategic vision for the industry's future workforce. We are already facing shortages in maintenance personnel. Looking ahead, automation will change the profile of required jobs. This means we must define today which trades and professions we need to develop to support the mining sector tomorrow.

What role will APRIMIN and its members play in regional mining integration in Latin America?
Many of our members bring the world's most advanced technologies and knowledge to the region. Chile's stable and developed mining environment has enabled local development and R&D centers. I believe Chile can be a platform for Latin America's mining sector. As other countries like Argentina, Ecuador and Colombia expand their industries, our suppliers have the opportunity to export expertise and services. This is not competition but regional collaboration. We want a strong neighborhood, and the growing demand for critical minerals makes room for everyone.

Could you clarify APRIMIN's role in the development of space mining technology?
We signed a collaboration agreement with the Chilean Mining Chamber to explore several areas of technological development, not just space mining. The media emphasized the space aspect, but our members are already developing technology for space and ocean mining. Some of our members are testing robotics and equipment off-Earth and repurposing space technology for safety applications in Chile. Others are designing systems for deep-sea resource extraction. Even though Chile officially opposes ocean mining, our suppliers are advancing low-impact technologies. The global need for critical minerals will eventually lead us to explore non-traditional sources, and we must be ready.

How is APRIMIN helping position Atacama and Copiapó as hubs for mining innovation?
We support the initiative, led by CESCO, to position Copiapó as the capital of emerging mining. Atacama has numerous small and mid-sized mining firms and infrastructure similar to that of large-scale operations, but on a smaller, more agile scale. This makes it ideal for piloting innovations. We believe that companies with advanced technology and know-how can use Atacama as a launchpad for regional deployment.

How does APRIMIN view the future of sustainable mining in Chile?
Chilean mining is already a global benchmark. Our success since the 1980s was due in part to the growth of specialized suppliers alongside the large mining companies. We must repeat that success now, this time with sustainability as the core. APRIMIN brings together companies that not only employ thousands but also drive innovation. Many of our members work across industries and continents, enriching our sector with global best practices.

What are APRIMIN's priorities for the next 12 months?
We are focused on four priorities. These are visibility for our members, strategic alliances, promoting sustainable mining, and supporting our mining partners. We want to highlight our members' contributions to employment and sustainability. We are also strengthening partnerships in areas like education through collaborations with groups such as Consejo Minero. We aim to encourage decisions that prioritize social and environmental value, not just economic return. ■

Claudia Rodríguez

Acting Executive Vice President

CHILEAN COPPER COMMISSION (COCHILCO)

> As a country, we have moved past the downward trend in production figures and are beginning to witness a rise once again.

Can you summarize the activities of Cochilco in the past year?
Our primary update over the past 12 months has been the upgrade of predicted investments from companies in their Chilean operations to US$83.1 billion between 2024 and 2033. Of the 51 projects in the pipeline, there are 17 in execution. The base and probable projects are those that have their environmental resolutions approved, which is 58% of the total investment figure. This investment represents the highest in Chile in the last 10 years.

Another highlight of the year was our copper production report. In 2023, national production reached 5.25 million t/y of copper and is expected to increase to 5.54 million t/y by 2034, peaking at 6.07 million t/y in 2027. As a country, we have moved past the downward trend in production figures and are beginning to witness a rise once again. Chile will also increase its share in global production to approximately 27.3% by 2033.

Is Chile's mining industry prepared for this level of investment?
I think that Chile is prepared for such investments currently, and this will only continue to improve over time. The government is currently working on streamlining the permitting process, both in terms of environmental impact assessments and framework permits.

Chile also possesses a mature mining infrastructure to absorb this kind of investment, and also a culture where shared infrastructure is not uncommon. This can be seen with the several collaborations Codelco has, including a joint project with Anglo-American, their involvement in El Abra, and the lithium industry with SQM.

What factors have led Cochilco to project a stable copper price in 2025 and 2026?
Certain global events have led to this projection, including geopolitical tensions, uncertainty regarding the recovery of the Chinese economy, and greater protectionist policies across the world. Copper is currently being investigated by the Department of Commerce in the US, which is causing volatility in markets that are concerned about whether tariffs will be imposed or not.

Aside from this, other factors have led us to have faith that copper will not drop below US$4/lb. Demand has continued to grow, and investments are beginning to materialize, leading to our confidence in the copper price moving forward. If anything, geopolitical tensions position Chile well to increase its leadership in copper production.

In what ways does Chile have a competitive advantage over other leading copper producers?
Our geological richness sets us apart from the rest. Also, our political stability and the high standards to which we hold operators from an environmental and social point of view mean that copper from Chile is some of the most sustainably produced anywhere in the world. Additionally, Chile has a system in place that ensures traceability of the copper produced here. Every producer must report to Cochilco their export contracts so that we can ensure the prices are in accordance with the market. This is something that separates Chile from the rest of the world.

How important are women to the mining industry, and how can we increase female participation?
By incorporating more women into leadership in the mining industry, we are providing different visions, a broader view, and a way of solving things that is different from the past, which enriches discussions around decision making. Diverse teams, not only in terms of gender, are helping mining move forward in a positive direction. Nowadays, women are not only involved in the administration and office work associated with mining, but are also in the field, being just as effective as men.

How can Chile encourage more greenfield investment?
It has been a few years since the government established the requirements to report all exploration findings to the National Geological Survey, which is attracting more juniors without the resources to obtain such information on their own. Increased collaboration in the mining industry and reduced permitting times will also help. Technology and innovation, coupled with the high copper price, are making greenfield exploration more attractive.

How does Cochilco incorporate environmental concerns into its evaluation of projects?
At the end of 2024, we produced our first ESG report regarding copper production. We will continue in this vein, as Cochilco often advises on government policy related to environmental issues. ■

When the Wind Does Not Blow

The impact of mining's dependence on variable power

Regardless of the location or operator of a mine, energy and electricity are vital to its smooth and productive operation, and renewable sources in the mining industry are generating a larger share of this than ever before. Chile is well-endowed with the resources vital to the green transition, leading by example, with an acute focus on renewable energies. There exists a symbiosis between the mining of copper and lithium and the usage of renewables, something which energy companies, mining companies, and the Chilean government are all keen to promote. The National Mining Policy 2050 is the government's first step in providing clear guidelines for electrification and decarbonization of the mining industry, to reduce GHG emissions by 50% by 2030 and ensure carbon neutrality in major mining operations by 2040, a decade earlier than the countrywide goal of decarbonization by 2050.

Due to the increased demand for renewable energy, the market has seen a boom in Chile, with InvestChile reporting that 68% of the nation's power is generated by renewable methods, and solar generation is now double what it was in 2020. However, the mining industry cannot become over-reliant on certain renewable energy sources, as currently, 35% of Chile's energy comes from variable methods such as wind and solar energy. These present issues with temperamental weather conditions that are constant in Chile, since the country is particularly prone to global warming and climate change, altering its meteorological makeup.

Possessing a portfolio of 1.8 gigawatts of projects in different stages scattered across Chile, Statkraft is a global leader in energy generation, including a hydroelectric power plant in Rucatayo. The company is currently looking into diversifying its generation, commissioning three new wind farms in Chile. "Renewable energies, as wonderful as they are, because they allow us to address the main environmental challenge that the planet faces today, also have challenges. That challenge has to do with variability. They are energies that are not available 24/7. So, regulations and incentives must be focused on addressing that variability and providing flexibility to the system," commented María Teresa González Ramírez, country manager of Statkraft Chile.

To help solve this, hybrid approaches to renewable energy are gaining traction in Chile, with the co-location of wind and solar farms being adopted by energy companies up and down the country. Energy company Aggreko focuses on hybrid energy solutions, combining renewables with backup power systems. Carlos Grez, general manager of Chile, Argentina, and Peru, stated: "We are increasingly looking to hybridize the solutions we offer our clients, combining renewable energy types to lower the overall operating costs. We are also looking into hydrogen solutions to reduce emissions and installing a portable electrolyzer to upgrade one of our operations in the mining sector in Argentina."

These provide a more diverse offering of energies, and with heavy investment in energy infrastructure and storage over the last couple of years, the issue of variability may soon be a thing of the past. "Batteries have dropped significantly in price, and today, they are competitive and provide a response that helps mitigate this risk of variability because they allow energy to be stored for when it is not being produced," expanded González Ramírez.

Energy companies are also looking to innovate as well as diversify to overcome the issue of variability. As one of Chile's oldest companies, with 168 years of history, Gasco has been supporting Chile's mining industry with energy development for decades, including recently at Escondida, where the company is aiming to eliminate 100% of the emissions from the facilities at the mine using solar thermal energy to heat electrowinning pools.

Gasco is having to devise innovative solutions to cater to the demand for renewable energy in Chile's mines, particularly in the lithium industry, which is intensive both in terms of electrical and thermal energy. "We are implementing projects through our subsidiaries that combine photovoltaic systems with batteries. We traditionally have generators based on liquefied gas (LPG) to deliver a supply with renewable energy while providing continuity through motor generators," revealed Juan Andrés Méndez Quezada, energy solutions manager for Gasco.

On February 25, 2025, Chile's vulnerability to energy issues was exposed on a global scale, whereby a nationwide blackout affected 90% of the population. This was caused by a malfunction in electronic software systems that triggered a disturbance in national power systems, causing President Boric to declare a state of emergency. The blackouts impacted many industries in Chile, and mining was no exception. Codelco reported impacts on all their operations, with emergency protocols implemented to ensure the safety of workers and operations.

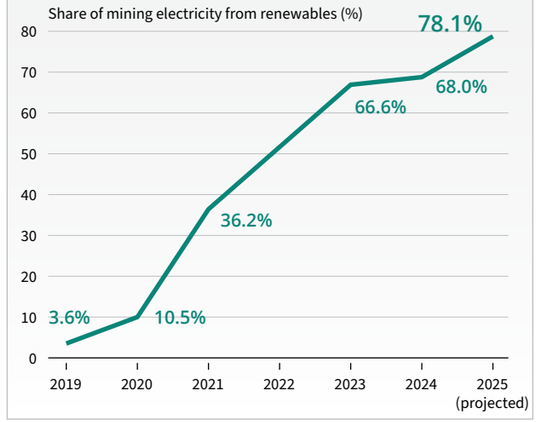
Carlos Grez of Aggreko believes more investment is needed in backup systems in mining when failures in national systems like this arise. The key to avoiding such problems is early planning, as energy companies can gain an understanding of the unique needs of each operation should grid access become unavailable. "There is a balance to be struck between continuity of operation and decarbonization, with continuity being more important in the early stage of a project. Before companies can think about decarbonization, they need to prove that their resource is worth developing and will bring profit to all stakeholders. When a company's position becomes more solid and moves into operation, often only then can companies truly devote themselves to decarbonization," Grez continued.

Hitachi Energy provides digital solutions to the energy needs of many industries, including mining. 2024 was a challenging year for the company, with market conditions slowing due to environmental approval issues, leading to many projects not materializing. Despite these setbacks, Hitachi Energy was able to roll out several new technologies to aid in the remote monitoring of power and energy, including the Vegeta Manager platform, which observes issues with power lines, and Grid Span, a modular solution designed for the mining to provide pre-engineered power supply to operations in remote locations. "Our challenge is to provide robust and reliable interconnection solutions for mining and other high-consumption areas. We also aim to increase the adoption of our digital technologies and service contracts with remote monitoring," explained Mauricio Mazuela, general manager of Hitachi Energy.

With their remote observation technology located in their offices in Santiago, the company makes energy in Chilean mining safer and more sustainable, whilst reducing costs for mining companies. The instability of renewable energy sources in their current form presents a great opportunity for the company, remarked Mazuela. He elaborated: "We have invested in expertise to support this, bringing worldwide specialists to address Chilean power electronics demands. Hitachi Energy is actively engaged with system operators, discussing and modeling different technologies to inform their technology promotion decisions."

Chile's mining sector is rapidly adopting renewable energy solutions to meet its ambitious goals for net zero and carbon reduction. Grid stability is, however, causing problems, and experts predict this to only increase as the effects of climate change tighten their grip on a country already struggling. With the advent of smart grids and AI-driven demand response gaining popularity and becoming ever more efficient, investment in energy transmission infrastructure and digital optimization will become key in ensuring the sustainable future of energy usage in mining. ■

Renewable energy usage in Chile's mining industry



Source: Ax Legal and Cochilco

Image by Kseniya Ragozina at Adobe Stock

> The emergence of electrification, hydrogen and ammonia is gaining ground because otherwise the industry will not be able to continue operating.

Juan Andrés Méndez

Energy Solutions Manager

GASCO

What is Gasco's role in the mining industry, and what updates can you share from the past year?

Gasco is one of Chile's oldest companies, with 168 years of history supporting energy development. In mining, we have focused strongly on displacing more polluting fuels while emphasizing energy efficiency and enhancing mining productivity. For example, we are implementing projects like the one at Minera Escondida, where we are eliminating 100% of emissions in facilities using solar thermal energy to heat electrowinning pools.

We are also actively working to utilize existing mining infrastructure to extend its useful life by heating leaching piles. For minerals resistant to acid attack, it has been demonstrated that adding salt and temperature, in addition to acid, can achieve liberation, avoiding or delaying the investment in a concentrator plant that requires more water use, creates environmental liabilities like tailings, and necessitates significant investments.

How do you manage renewable energy variability to ensure a constant supply for mining operations?

We are implementing projects through our subsidiaries that combine photovoltaic systems with batteries. We traditionally have generators based on liquefied gas (LPG) to deliver a supply with renewable energy while providing continuity through motor generators.

For thermal energy requirements, we supply steam using LPG, which is much cleaner than diesel. The advantage is that this plant works to power both motor generators and boilers. Additionally, we capture excess photovoltaic energy that would otherwise be wasted through electric boilers to generate steam, integrating and being more efficient with renewable energy use.

Are Chile's ambitious carbon neutrality goals realistic for the mining industry?

Even Europe is already somewhat flexing its compliance goals, so it is interesting that Chile has set itself such ambitious goals. However, the copper industry is somewhat atypical because of rising of demand and the sales values force companies to be more efficient and adopt technologies that reduce emissions and be more productive with the current infrastructure. The emergence of electrification, hydrogen, and ammonia is gaining ground because otherwise the industry will not be able to continue operating.

What infrastructure challenges exist for renewable energy in mining, especially at high altitudes?

Altitude presents two major challenges: reduced oxygen content and extremely low temperatures. We can implement off-grid generation with photovoltaic systems complemented by batteries, but battery costs are not currently viable for competitive rates. This requires a complementary solution where generation with LPG engines is essential.

LPG remains gaseous even at -45°C and can work perfectly in poor temperature conditions. Since tanks are pressurized, there is no effect from reduced pressure. For oxygen reduction, LPG equipment generates more heat and naturally comes with derating adjustments, so they are set to work with less oxygen.

What is the adoption rate of LPG technology in Chile's mining industry?

In the last four or five years, there has been a breakthrough. Gasco started operating our Teno power plant with LPG motors to support renewable generation in the national electrical system. We have been displacing diesel generation and even coal generation. To our surprise, adoption has been very strong, with dispatch rates much higher than planned, requiring us to double maintenance efforts.

We have seen operations at 3,000 m or higher implementing pile heating based on LPG. Since they could not supply electrical energy, they also implemented LPG-based motor generators. We have proven the technology works for generating hot water, steam and electricity over 3,000 m in altitude.

What are Gasco's plans for the mining sector and potential expansion?

Beyond strengthening our traditional business, we have two major challenges: making this traditional business increasingly green using more renewable energy and contributing to the country's development with different technologies. We are implementing the BHP project with solar thermal energy using no LPG molecules, and projects like our Gasco Luz line, which is 100% photovoltaic.

We are not only supplying gas but also steam and hot water, placing our equipment in operations that operate more efficiently. This allows us to reach operations, showing we can operate, maintain, and deliver electrical energy and steam. Mining projects in Peru, Mexico, and even the US are calling us about copper and lithium projects, interested in the pile leaching technology and energy supply. Argentina presents a great opportunity with projects near the border, allowing integration and joint work. ■

Mauricio Mazuela

General Manager

HITACHI ENERGY

Can you provide an overview of Hitachi Energy's work and updates from the past year?

The company launched a significant innovation with our remote monitoring system, which became operational in mid-2024. Additionally, the company introduced its Vegetation ManagerTM platform, which uses satellite technology to monitor power lines for issues such as vegetation growth and load problems, eliminating the need for manual patrols.

Another exciting development was the rollout of Grid-eXpandTM, a modular solution designed for the mining and utility sectors. The combination of these technological advancements has positioned Hitachi Energy as a key player in providing sustainable and efficient solutions in Chile.

Where is Hitachi Energy's R&D focused, and what technologies will most impact the industry in Chile?

One of the most notable advancements is the development of electrical equipment using inert gases, offering a more environmentally friendly and safer solution. Additionally, the company is advancing energy-efficient transformers, such as the 'EconiQTM' series, which use among others innovations, natural esters to reduce emissions, aligning with global sustainability efforts. These transformers, first introduced in a mine in 2023, support Chile's zero-emissions goals by minimizing environmental impact and energy loss. ■

María Teresa González

Country Manager

STATKRAFT

Can you provide an update on Statkraft's operations in Chile over the last year?

At Statkraft, we have a portfolio of 1.8 GW of projects in different stages. We have an operating hydroelectric power plant called Rucatayo, a run-of-river plant of 52 MW on the Pilmaiquén River. We are also constructing another hydroelectric plant, Los Lagos. We are developing projects in seven regions, and last year we had important news with the commissioning of our first three wind farms in Chile: Cardonal, Manantiales y Los Cerrillos in the Libertador General Bernardo O'Higgins region.

How realistic are Chile's goals for renewable energy and carbon neutrality?

Chile has been advancing in energy transition in a remarkable, noteworthy way. It is a country that has set out in an unprecedented voluntary agreement between the public and private sectors to decarbonize. We saw last year that around 70% of the energy generated in the country was renewable.

What is Statkraft's vision for the future in Chile?

Five years ago, we set ourselves a goal of gaining scale. We have a very attractive project portfolio of almost two gigawatts in different technologies. We aspire to have a scale of around 800 or 1,000 MW of installed capacity by 2030. ■

Carlos Grez

General Manager Chile, Argentina, Peru

AGGREKO

How are Chile's mining companies handling decarbonization compared to other Latin American countries?

There is a balance to be struck between continuity of operation and decarbonization, with continuity being more important in the early stage of a project. Before companies can think about decarbonization, they need to prove their resource is worth developing and will bring profit to all stakeholders. When a company's position becomes more solid and moves into operation, often only then can companies truly devote themselves to decarbonization. Chile in general tends to have companies in a more consolidated stage of operation when compared to other mining jurisdictions in Latin America. Mines in Argentina and Peru tend to be in an earlier stage, which means companies are not yet prioritizing decarbonization strategies.

Where are Aggreko's R&D efforts focused?

We are increasingly looking to hybridize the solutions we offer our clients, combining renewable energy types to lower the overall operating costs. Additionally, Aggreko has been looking at using the excess heat produced by our generators to replace the boilers at operations, which can significantly increase efficiency. We are also looking into hydrogen solutions to reduce emissions and installing a portable electrolyzer to upgrade in one of our operations in the mining sector in Argentina. ■

MINERAL PRODUCTION

> Chile has a long and well-established mining history, and what sets it apart is the world-class mining ecosystem it has developed over the years, that fosters innovation and operational excellence.

Juan Andrés Morel
Vice President of Operations
LUNDIN MINING

GBR Series • CHILE MINING 2025

Image courtesy of Antofagasta Minerals

Copper and Lithium Production

The metals of the moment

Despite the challenges of recent years and new competitors rising on the global stage, Chile is still a world leader in the production of copper and lithium, maintaining the top spot and second place, respectively, in terms of production figures. Chile is responsible for 28% of the world's copper supply and 53% of the total mining investment in Latin America, as state-led and private companies are expected to invest US$83 billion in the country between 2025 and 2033. "Chile has the potential to continue being a global leader as the increased Demand for copper is something we are all working to address. Because of the importance of mining in Chile and the general support for the industry, there has been a lot of growth in the industries that support mining," said Joshua Olmsted, president and COO, Freeport-McMoRan Americas.

With Argentina, Peru and Ecuador beginning to contribute increasing amounts to global copper production, South America has the potential to become a mining superpower, spearheaded by its most southerly country.

In 2023, Codelco, Chile's state-operated mining giant, recorded its lowest production figures in 25 years. Since then, all efforts have been directed at restoring the company's former strength. In this vein, Codelco acquired Enami's 10% stake in Quebrada Blanca for US$520 million, aiming at increasing production at the plant and fostering collaboration between Teck and Codelco.

Furthermore, in February 2025, alongside Anglo American, Codelco announced a historic MoU to collaborate on the neighboring Andina and Los Bronces projects. According to Codelco, this will become the fourth-largest mining district in the world, possessing about 8 million t of resources between the two deposits. The collaboration will help both companies avoid many of the problems other mining companies in Chile are facing, such as access to infrastructure and declining ore grades, and increase production by 120,000 t/y.

One of Codelco's flagship projects and the largest underground copper mine in the world, El Teniente, celebrated its 120th birthday in 2025. As a way to extract more copper from the historic mine, Amerigo Resources, through its Minera Valle Central (MVC) operation, is transforming El Teniente's fresh and historic tailings into copper concentrates.

As ore grades keep declining, this model may become more attractive for an increasing number of Chile's copper producers. "Every producer faces the challenge of maintaining or increasing production. To do so, the traditional path has been to look for more ore to mine, which is very capital intensive on one hand, and more so given that ore grades are getting lower and lower. The option of looking for additional copper not in a new mining sector, or a deeper mine level, but in your tailings, makes a lot of sense," explained Aurora Davidson, CEO of Amerigo Resources.

Many of the announced investments are looking to expand mine life and take existing mines further underground, as seen with Collahuasi transitioning from an open pit mine to an underground one.

A major project that was completed in 2024 was the expansion of Teck Resources' Quebrada Blanca operation. Dale Webb, VP operations, Latin America, commented: "Teck's copper production increased 50% from the year prior, up to 446,000 t/y, and this was largely driven by our operations in Chile. At Quebrada Blanca, as ramp-up work nears completion, our focus moving forward is on further optimization and debottlenecking, which will potentially increase throughput by a further 15 to 25%."

This was a major undertaking for the company, paving the way for many of the investments that will be seen in Chile in the coming years, and helping Teck Resources set a new company record for annual copper production.

Australian mining company BHP accounts for 27% of Chile's total copper production and has announced plans for between US$10.7 and US$14.7 billion of investment over the next decade, most of which is concentrated on one of the largest copper mines in the world, Escondida. In 2024, the mine produced 1.25 million t, with a 2025 production guidance of between 1.18 and 1.3 million t of copper. The company is expecting output from its mines in Chile to drop by 300,000 t/y by 2030, which explains the need for such a large investment.

Mining companies are using different methods of investment in their Chilean properties to offset declining ore grades. Lundin Mining is leveraging its property packages to unlock further value in its projects. "Caserones has 60,000 hectares of exploration properties, and we are launching the most extensive exploration program there since its discovery. Although there have been changes to Chile's mining laws, we still view the country as a stable mining jurisdiction," outlined Juan Andrés Morel, the company's vice president of operations.

Last year, Caserones achieved 125,000 t of production, with Lundin's other property, Candelaria, not meeting its production guidelines due to lower-than-expected ore grades in the latter part of the year. Lundin Mining increased its ownership in the Caserones mine by 19% in an attempt to further aid in meeting production guidance in years to come. Morel added: "This is a clear demonstration of our commitment not only to Chile but also to South America and copper. Our long-term strategy is to strengthen our position as a leading copper-focused company, and many of the transformational decisions we made in 2024 were aligned with that objective."

Lower grades are something Glencore is familiar with in Chile at Lomas Bayas. During 2025, Compañía Minera Lomas Bayas celebrated 2 million hours without lost time accidents and managed a 13.1% increase in copper production to reach 74,000 t for the year. Andrés Souper, general manager of Glencore Chile, said: "Lomas Bayas operates with an ore grade of approximately 0.27%, which means that over its more than 20 years of operation, it has had to constantly evolve to remain competitive."

The mine won the 2024 SONAMI National Mining Award, showcasing how mines can thrive even when operating at lower grades. Glencore's complex in Altonorte also achieved impressive production figures of 1.1 million t/y of copper concentrate.

Another multinational mining company with a record year of production in 2024 was Capstone Copper, which ramped up operations at both Mantoverde and Mantos Blancos. The Mantoverde Development Project drove most of the 12% growth in consolidated copper production at the mine, adding a 32,000 t/y sulfide concentrator and a tailings storage facility. Feasibility studies were submitted for Mantoverde Optimized, a low-cost

Image courtesy of Caserones

project that will deliver around 20,000 t/y of copper and extend the mine life by 25 years. Chairman John Mackenzie believes there are several reasons why large mining companies are looking at extensions rather than greenfield projects: "Existing mines are seeing significant grade declines, and new deposits face increasing complexities. In the long term, higher prices might incentivize additional copper mines, but it is not just economics that restricts new developments. Environmental, social, and infrastructural factors also play a significant role. Whereas it used to take 2-5 years to bring a new deposit to production, today it can take 8-12 years or more," he said.

Amid these challenges, Capstone Copper is positive that it will thrive and reach its forecasted production of between 220,000 and 255,000 t/y of copper. "Firstly, we will be focused on operational execution across our portfolio through the implementation of our Asset Integrity Program across all our sites, delivering strong operational performance and benchmarking to drive production and cost efficiencies," highlighted Capstone's CEO, Cashel Meagher.

Expansions have also been announced by Antofagasta Minerals, which announced that US$3.5 billion of its total US$7.57 billion investment will come into effect in 2025. These upgrades include a US$2 billion desalination plant at Los Pelambres, a US$1.2 billion Zaldívar mine extension to extend operations to 2051, and an investment of US$4.4 billion in Nueva Centinela, adding 144,000 t/y of copper equivalent as well as upgrading the molybdenum plant.

"Our strategy centers on investing in growth so we are well positioned to meet the forecast demand increases from electrification, growth in data centers, energy security, and the energy transition. Our growth projects at Centinela and Los Pelambres will significantly boost production," highlighted Iván Arriagada, CEO of Antofagasta Minerals.

Furthermore, in an exception to the rule, ore grades at Los Pelambres are expected to increase in 2026.

US$7.5 billion will be invested by Freeport-McMoRan in the El Abra operation, looking to introduce a new concentrator plant, water pipelines, and upgraded desalination facilities. "We discovered a significant sulfide resource there about a decade ago and have spent time truly trying to scope the size of the resource. We are now looking to add milling operations and are in the process of defining the specifics of this. We aim to take El Abra from about 100,000 t/y to closer to 350,000 t/y," explained Joshua Olmsted of Freeport Americas.

In December, the company entered the environmental assessment stage for a US$741 million expansion Sulfolix Leaching Pile Modification, the first step in the process that could take up to eight years due to permitting timelines.

Chile's mining sector stands at a pivotal moment. Despite declining ore grades and intensifying regional competition, the country continues to lead global copper production. Massive investments from both state-owned and private companies aim to expand mine life, increase efficiency, and embrace innovative extraction methods. With strategic partnerships, infrastructure upgrades, and a focus on sustainability, Chile is positioning itself to remain a dominant force in global mining for decades to come.

Lithium

Producers in Chile are looking to capitalize on the increased focus of the government following the release of the National Lithium Strategy.

During the 1990s, Chile possessed 90% of the known global lithium reserves, dropping to 40% in the years since, with Chile's share of worldwide production decreasing from 50% to 25%. This has been driven by discoveries in other parts of the world, such as Africa, spurred by the increasing global importance of critical minerals and the corresponding rise in price. Exemplifying the heightened attractiveness of lithium was Rio Tinto's entry into the market through the purchase of Arcadium Lithium for US$6.7 billion, giving Rio Tinto ownership of the Rincón project in Argentina. The move positions Rio Tinto as the world's third-largest lithium producer and involves it in one of the most technologically advanced lithium markets in the world, where direct lithium extraction (DLE) technologies are commonplace.

Both public and private organizations will have to work and even collaborate to maintain Chile's leadership in critical mineral production. New players, experienced producers, and exploration companies alike will all be needed.

Aiding Chile in its global levels of lithium production is Albemarle, which achieved record production levels at both its Salar de Atacama and La Negra sites. Whilst some may view the likes of Rio Tinto entering the South American lithium market as a threat, Roland Haemmerli, VP operations and country manager of Albemarle, welcomes such activity. "We fully support the expansion of the lithium industry as there is room and a need for multiple players to meet the demands of the energy transition and electric mobility. That said, our leadership comes from experience, global scale, and the strategic positioning of our assets," he discussed.

A company looking to capitalize on increased major mining companies in the lithium space is Summit Nanotech, whose DLE technologies are aiding a more sustainable and efficient way of extracting the critical mineral. "Independent third-party validation confirms that our technology produces lithium faster than competitors while using the same amount of water and energy, making our process much more efficient than both competitive technologies and traditional methods. On a per-ton basis, we use significantly less water, energy, and reagents, all while producing a higher-quality product," emphasized the company's CEO, Amanda Hall.

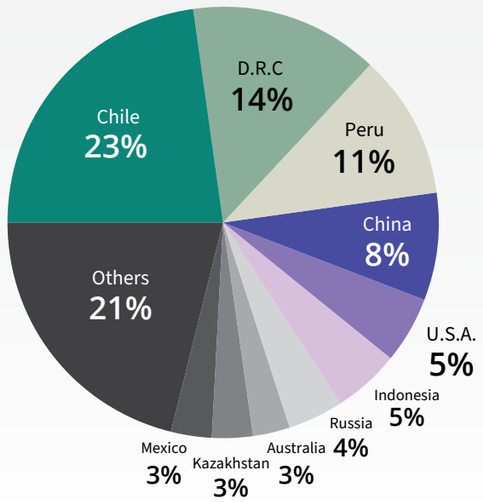
With DLE technologies enhancing the project economics of lithium mining, it seems like only a matter of time before the market returns a favorable evaluation of the critical mineral once again. Cochilco estimates lithium investments between 2023 and 2026 to total US$2.1 billion, and with more Special Lithium Operation Contracts (CEOLs) announced as part of the National Lithium Strategy, Chile is set to retain and reinforce its position at the top of the regional lithium league table, despite fierce competition entering the race. ■

Carlos Parada
President
NETMIN

"There is already a degree of organic collaboration through the multinationals operating in the region. These companies tend to standardize their practices and share knowledge across their different operations."

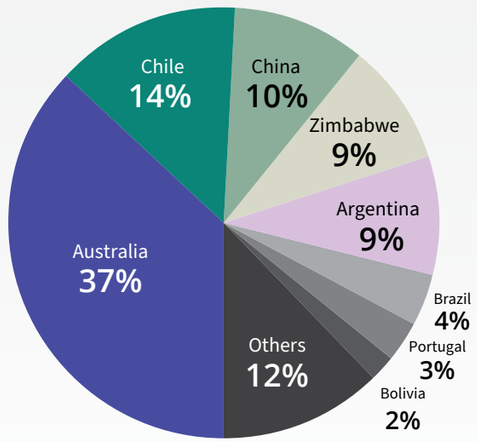
Image courtesy of Caserones

Global share of copper production (2024)



Source: investingnews.com

Global share of lithium production (2024)



Source: investingnews.com

Iván Arriagada

CEO

ANTOFAGASTA MINERALS

> Our priority this year is advancing brownfield projects at Los Pelambres and Centinela, alongside sustainability initiatives.

Can you provide an update on Antofagasta Minerals' projects?
We have been investing in our key projects at Los Pelambres and Centinela, progressing as planned. The two projects are forecast to increase our copper production by more than 30% when complete.

We also had a strong operational performance last year, producing 664,000 t/y of copper. In 2025, we expect production to be between 660,000 and 700,000 t/y. Looking further ahead, our medium-term aspiration is to grow production by approximately 30% compared to 2024.

How does Antofagasta Minerals plan to combat declining ore grades at its projects?
Our growth projects at Centinela and Los Pelambres will significantly boost production. As brownfield sites, they require less capital, are lower risk, and have shorter timelines than greenfield projects. Additionally, we often hear about declining grades, but at Los Pelambres in 2026, grades are expected to increase.

Does Antofagasta Minerals have any plans for collaboration, and how do you see collaboration increasing in the future?
We welcome collaboration, as seen in our partnership with a water management consortium at Centinela. The consortium acquired and now operates our water transportation assets and has invested in supplying water to the new concentrator once complete. We invested in Compañía de Minas Buenaventura last year, and continue to work with the team in Peru to get the most value out of our partnership. More broadly, collaboration along the whole value chain is key to creating a more resilient and sustainable industry. For example, we collaborate with suppliers to boost productivity and sustainability standards through our 'Suppliers for a Better Future' program, where initiatives include carbon reduction plans in key contracts, diversity targets for suppliers, and the provision of training.

Which technologies will play the biggest role in helping the company reach its net-zero targets?
Emissions reduction is a key pillar of our purpose to develop mining for a better future. Last year, we updated our targets to include a 50% reduction in Scope 1 and 2 emissions by 2035, and a 10% reduction in Scope 3 emissions by 2030, based on our figures from 2022, on the pathway to our goal of carbon neutrality by 2050. As most emissions come from diesel haul trucks and vehicles, electrifying our fleet is key. Amongst other initiatives, ABB, along with Komatsu, is helping us to develop a pilot trolley system at Los Pelambres. The system can reduce diesel consumption by up to 90% in certain environments.

We already use electric vehicles in our operations. Our transport division, FCAB, unveiled the first hydrogen-powered locomotive in Chile and South America in Q4 2024, which will allow us to test and better understand the use of alternative fuels for transport. At Centinela, we operate the largest fleet of electric pick-up trucks in the Chilean mining industry.

What do you hope will be an immediate focus of the new Chilean government concerning the mining industry?
Copper continues to demonstrate robust market fundamentals over the medium and long term, given its role in energy security, global growth, and electrification. Chile is well placed to meet demand, as its stable political environment makes it attractive to investors. We hope to continue working with the government to advance the sector and ensure Chile can continue to be a competitive supplier of this critical resource.

How can Chile ensure it stays ahead of other regional mining jurisdictions in terms of global supply?
Part of this is ensuring we invest in our future generation of talent. At Antofagasta Minerals, we are dedicated to educating our workforce so they have the skills they need to thrive. We run a Young Professionals Programme to attract and nurture talent, integrating 24 new participants in 2024.

What plans does Antofagasta Minerals have for the rest of 2025?
For 2025, we are focused on delivering production growth to meet the rising demand for copper, aiming to increase production in the medium term once these projects are finalized. Our two major growth projects at Los Pelambres and Centinela will give us a solid foundation to achieve that goal and provide the copper the world needs to power the shift to electrification.

Our priority this year is advancing brownfield projects at Los Pelambres and Centinela, alongside sustainability initiatives. With these growth projects, a strong balance sheet, and Chile's continued stability, we are well-positioned for 2025 and beyond. ■

Brandon Craig

President Americas

BHP

> The Americas is the growth engine of BHP, and both at Escondida and Pampa Norte we have plans to extend the lifespan of our operations for decades.

Can you provide an update on BHP's operations in Chile through 2024 and the first half of 2025?
In fiscal year 2025, Escondida achieved a significant milestone, reaching its highest level of copper production in the last 17 years, with a 16% increase in just one year. Spence also achieved record production with a 5% increase. At a Group level, copper production rose by 8%. Most importantly, all of this was accomplished with zero fatalities.

How important are Escondida and Pampa Norte to BHP's overall operations, and how do you see the role of copper evolving in your portfolio in the years to come?
BHP in the Americas is the growth engine of the company, and both at Escondida and Pampa Norte —which includes Spence and Cerro Colorado— we have growth plans that will allow us to extend the lifespan of our operations for decades and strengthen our leadership position in the industry. We seek to unlock the maximum value from our assets. At Escondida, we are working to execute an investment plan of US$10 billion over the next 8 years, aimed at optimizing overall production levels. At Escondida, the current resource supports a 65-year mine life.

At Spence, in January we obtained the RCA (Environmental Qualification Resolution) submitted in 2023 to extend the lifespan of its leaching process until 2039. We are also progressing with studies designed to drive additional improvements.

In the case of Cerro Colorado, we continue to move forward the studies for a potential reopening of the operation, having entered in care and maintance in December 2023, with an underlying resource base of more than 2 billion t of copper.

What role do you see Chile playing in the global copper market moving forward?
We project global copper demand to grow by around 70% to over 50 million t/y by 2050. This will be driven by the role of copper in current and emerging technologies, as well as the world's decarbonization, electrification and digitalization goals. As the world's biggest copper producer, Chile has a major role in meeting this demand.
We believe we hold competitive advantages that position us to deliver the copper the world needs. For example, in fiscal year 2025 BHP produced over 2 million t of copper across the Group —a record level of production representing an 8% increase.

Our business reflects a strategic resilience amid market volatility, through consistent asset performance and operational excellence.

Do you foresee more collaboration in the mining industry moving forward, for example, joint ventures like BHP's with Lundin to develop the Vicuña project?
Collaboration is essential for growth across the sector. This year we signed an agreement with Codelco for the exploration of the Anillo mining property in Antofagasta and created the Vicuña joint venture in Argentina together with Lundin Mining. These instances clearly demonstrate how industry collaboration can create opportunities to potentially access untapped copper resources in parallel with lowering risk.

How is BHP using AI technology to boost efficiency and productivity at your operations in Chile?
AI has enabled us to unlock potential value through innovations such as predictive maintenance, energy optimization, autonomous vehicles and machinery operation, data-driven decision-making, and real-time monitoring and reporting.

AI is being used to identify new business opportunities, such as improving the efficiency of resource discovery. AI is also helping us operate more efficiently and sustainably and, most importantly, keep our workforce safe.

What are your plans for BHP in Chile in the coming years?
Our portfolio focuses on developing and operating large, long-life assets in commodities that benefit from the megatrends playing out around us. And if you look at BHP's portfolio, most of the copper we produce as a group is produced in this region. In Chile alone, we produced over 1.5 million t of copper in the past fiscal year. We aim to keep growing while contributing to Chile and the regions in which we operate and have a presence —such as Antofagasta and Tarapacá.

At BHP in the Americas we have a clear ambition for 2030: to be BHP's growth engine, to continuously transform the mining industry through innovation and operational excellence, and to cultivate a thriving workplace.

At BHP, we are excited about the opportunities that lie ahead in Chile and the Americas. ■

Joshua Olmsted

President and COO

FREEPORT-MCMORAN AMERICAS

> The challenge for Chile will be to find ways to streamline and expedite the permitting process without compromising environmental standards.

Can you give us an update on Freeport-McMoRan's developments from El Abra over the past year?
We have increased production at El Abra year-on-year and remain focused on every opportunity to produce additional copper. We are working on a couple of major projects at the site, including building a new leaching stockpile, which has received the required environmental permits, to sustain our crushed leach operations. We are also looking at several ways to enhance the site to secure its long-term future.

How will the proposed US$7.5 billion investment improve operations at El Abra?
Since its inception in the late 1990s, El Abra has been a leaching and hydrometallurgical operation. We discovered a significant sulfide resource there about a decade ago and have spent time trying to scope the size of the resource. We are now looking to add milling operations and are in the process of defining the specifics of this. We aim to take El Abra from about 100,000 t/y to closer to 350,000 t/y.

What is your view of Chile's role as the leading copper producer as the demand increases?
Chile has the potential to continue to be a global leader. The US$83 billion of projected investment by 2033 does come with challenges, as the timeline may not be feasible given all of the processes required to bring projects to fruition. The challenge for Chile will be to find ways to streamline and expedite the permitting process without compromising environmental standards.

What are some of Freeport-McMoRan's ESG initiatives in Chile?
It is important to recognize that mining has a far-reaching impact, and the question we ask is how we can be a good neighbor and foster sustainable development where we operate. El Abra supports dozens of programs each year that range from a cookbook that features the culinary heritage of the high Andes to a launderette that services the El Abra operations and solar panels to power irrigation systems for local farmers. Ongoing community engagement is also key, where we work together to find win-win opportunities.

How will Freeport-McMoRan look to implement technology into El Abra?
We have started to implement autonomous fleets at our sites in the US, and this will open the door for discussions about what is next at El Abra in terms of technology. As we look at any project in our portfolio, the company must think about incorporating technology and innovation to become more competitive going forward. Historically, all of our operations in the Americas have been relatively low-grade, so we need to do whatever we can to ensure maximum efficiency.

What are some of the challenges affecting copper mines in Chile, and how is Freeport-McMoRan looking to overcome these?
Declining ore grades are a challenge, but this is relative to each particular project. This drives up your unit mining cost and can greatly affect the economics of a project. Another challenge in Chile is access to water, and this has led us to look at desalination rather than using freshwater at El Abra. This increases capital requirements and operating costs, putting more pressure again on unit cost. General costs also have increased due to the global inflationary pressures.

Community expectations around sustainability, transparency, and shared value are higher than ever and look very different in each county and community. This can be challenging to navigate, which is why we focus on ongoing stakeholder engagement.

How does Freeport-McMoRan ensure the retention and attraction of skilled workers?
We work with local communities through indigenous scholarship programs to help facilitate education and self-development. The most important factor, however, is the culture that we have as a company, which is something that attracts workers from day one. This is then passed along by word of mouth through communities and families, making Freeport-McMoRan one of the most attractive mining companies to work for in the world.

What are your plans for Freeport-McMoRan over the next year, particularly at El Abra?
Strategically, we are looking to get all our permits ready by the end of 2025 so we can move forward with the projects in Chile. On a global basis, we continue to look for opportunities to develop our brownfield portfolio and work to improve efficiencies, increase production, and increase mine life at our operations. ■

Andrés Souper

General Manager

GLENCORE CHILE

> The stability of the copper market will depend on the ability of Chile and other producers to balance growth with sustainability.

Can you provide an update on Glencore's operations in Chile?

Glencore has succeeded in consolidating itself as a key player in Chile's copper mining industry through its Compañía Minera Lomas Bayas and Complejo Metalúrgico Altonorte operations, both of which enjoyed a successful 2024 in terms of progress and production. For example, at Altonorte, we can highlight the sustained reduction in freshwater consumption resulting from the consolidation of the slag cooling in pots. Likewise, the use of natural gas aims to lower GHG emissions, with a target of zero emissions by 2050. In terms of production, Altonorte achieved a historic record of 1,109,649 t/y of copper concentrate.

Meanwhile, Lomas Bayas reached a milestone of two million hours worked without lost time accidents across three strategic projects designed to ensure long-term copper production. In terms of output, Lomas Bayas achieved a 13.1% increase, going from 66,000 t/y of copper in 2023 to 74,000 t/y in 2024. The crowning achievement for the site's management was undoubtedly the recognition we received by winning the 2024 SONAMI National Mining Award, highlighting our commitment to sustainability and innovation. Another major milestone in 2024 for Glencore Chile was the signing of a contract with Empresa Concesionaria de Servicios Sanitarios S.A. (Econssa), which will allow us to operate under a groundbreaking circular model that uses desalinated seawater.

What is the importance of sustainability and community initiatives for Glencore Chile?

We continue advancing toward Glencore's global emission reduction goals, which include greater use of renewable energy and water-use optimization. In terms of community engagement, we maintain a close and supportive relationship with the communities surrounding our operations through programs focused on education, employment and sustainable development. For instance, at Altonorte, we continuously promote initiatives in collaboration with 20 organizations across seven key areas related to the smelter.

How do you see the global transition to clean energy impacting the copper market?

With the global transition to clean energy, the scarcity of copper will become even more critical. However, it is not the only factor impacting this scenario. Supply limitations due to aging deposits, environmental regulations, and supply chain issues also contribute to stressing inventories. Chile has the opportunity to boost production by promoting innovation and attracting foreign investment.

Nevertheless, it is undeniable that the system can be improved. Various regulations and tools could expedite progress and unlock initiatives, allowing us to maintain our leadership in the industry while still meeting environmental requirements. In the long term, the stability of the copper market will depend on the ability of Chile and other producers to balance growth with sustainability. For this reason, the implementation of new technologies and strategic policies will be essential to ensure the supply of this critical resource for the global energy transition. At Glencore Chile, we are focused on maximizing efficiency in copper production while maintaining high standards of responsible mining. Our investment in long-term solutions allows us to continue supplying copper with a reduced environmental impact.

What are the biggest risks facing Glencore Chile and how are you addressing them?

Although we maintain a strong operational and strategic position in Chile, we remain highly alert to potential situations that could become critical for the industry, such as declining ore grades. Lomas Bayas operates with an ore grade of approximately 0.27%, which means that over its more than 20 years of operation, it has had to constantly evolve to remain competitive.

Another challenge for both Glencore Chile and the national mining industry is water management and environmental protection. For this reason, our operations in the Antofagasta region — Lomas Bayas and Altonorte — are implementing water efficiency initiatives. Additionally, Collahuasi is already developing a desalination plant aimed at ensuring water security.

The transition to more digitalized and automated mining requires a workforce with new skills, and the industry is facing a talent shortage in areas like automation, data analysis, and various STEM fields.

What are your plans for Glencore in Chile for 2025 and beyond?

The goal remains to maintain efficient and profitable operations of our assets that meet business expectations — always prioritizing people and ensuring compliance with environmental requirements. Our Human Capital and HSE+R teams continuously develop improvement processes for various initiatives to ensure safety and well-being. ■

Juan Andrés Morel

Vice President of Operations

LUNDIN MINING

> While regulatory changes can create challenges, we believe that through optimization and efficiency improvements, we can mitigate any potential impacts on our business.

What were Lundin Mining's key developments in Chile recently?

The year 2024 was a strong year for our Chilean operations. At Candelaria, we produced 162,000 t of copper. Although we slightly missed our production guidance due to lower-than-expected grades in the fourth quarter, overall performance was very positive. In the second half of the year alone, we produced 100,000 t, which demonstrates our capacity to operate at a rate of 200,000 t/y. Furthermore, 2024 was one of our best years regarding safety performance. With the approval of the 2040 Environmental Impact Assessment, we are now focused on conducting the necessary studies and initiating the projects included in that approval.

At Caserones, we achieved a production of 125,000 t for 2024, meeting our guidance.

This year, we increased our stake in Lumina Copper and thus Caserones by 19%. This is a clear demonstration of our commitment not only to Chile but also to South America and copper. Our long-term strategy is to strengthen our position as a leading copper-focused company, and many of the transformational decisions we made in 2024 were aligned with that objective.

How does Chile compare as a mining jurisdiction with growing competitors like Ecuador and Argentina?

Chile has a long and well-established mining history, and what sets it apart is the world-class mining ecosystem it has developed over the years. The presence of mining companies, service providers, startups, and technology firms has created an environment that fosters innovation and operational excellence. The expansion of mining industries in countries such as Argentina and Peru presents an opportunity for Chile to export its mining expertise.

How is Lundin Mining prioritizing sustainability?

Our Chilean operations are a strong example of our commitment to sustainability. At Candelaria, we have been operating entirely on desalinated water since 2013, and we have a power purchase agreement that is based entirely on renewable energy. Candelaria was also the first operation in the Atacama region to receive the Copper Mark certification.

Caserones has followed a similar path, operating with a power purchase agreement that is 100% based on renewable energy. In late 2023, Caserones also received the Copper Mark certification. Beyond environmental sustainability, we place great importance on community relations. Our teams at both sites maintain regular engagement with local communities, focusing on the development of local suppliers and service providers. Sustainability is embedded in our business strategy.

How does the strong outlook for copper impact Lundin Mining's global and Chilean operations?

We have a very positive outlook on copper. Our commitment to the metal is best exemplified by our investment in the Vicuña project, which we expect to become one of the largest copper projects in the coming decades. Having BHP as our partner in this project is a strong validation of our confidence in copper and its future demand.

Our current growth strategy is focused on organic expansion through our existing operations and brownfield developments rather than greenfield exploration. For example, Caserones has 60,000 hectares of exploration properties, and we are launching the most extensive exploration program there since its discovery. Although there have been changes to Chile's mining laws, we still view the country as a stable mining jurisdiction. Our decision to increase our ownership in Caserones reflects this confidence. While regulatory changes can create challenges, we believe that through optimization and efficiency improvements, we can mitigate any potential impacts on our business.

What are Lundin Mining's priorities in Chile for 2025?

The year 2025 will be a critical period for consolidating the major transformations we implemented in 2024. Last year was a very busy year for us, marked by several significant milestones, including the acquisition of an additional 19% stake in Caserones, the establishment of a joint venture with BHP at Vicuña, the sale of our European assets, and the relocation of our corporate office from Toronto to Vancouver.

Our primary focus in 2025 will be on enhancing our competitiveness and efficiency across all sites. Moving forward with our joint venture with BHP will be crucial, particularly given the regulatory timeline under the new licensing laws, which we cannot afford to miss. Additionally, advancing the engineering work for José María, which we expect to be the first project within the Vicuña district, will be a key priority. ■

Aurora Davidson

CEO

AMERIGO RESOURCES

Can you provide an update on the highlights and achievements of Amerigo Resources?
2024 was an excellent year for us at Amerigo Resources, as we returned to full operations following the floods in 2023. We had excellent operational performance at our Minera Valle Central (MVC) plant, outperforming our guidance for copper production and cash cost. We produced 64.6 million lb of copper and 1.3 million lb of molybdenum, with an annual cash cost of US$1.89/lb.

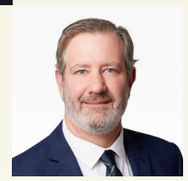
We achieved a plant availability of 97%, which is industry-leading globally. Furthermore, we have completed three years without lost-time accidents at MVC, which we are very proud of and speaks volumes about our commitment to our workforce.

What are the differences between MVC and other copper concentrator plants?
We work with the same technologies and processes as most other concentrator plants. However, the big difference comes with the grades we deal with. The copper grade in the tailings is much lower, as it has already gone through the concentrator at El Teniente. Working with low-grade material is a challenge, as naturally there is less copper to recover, but this is where our expertise at MVC shines.

Our MVC operation is essentially a copper factory. We do not have to do all the hard-core mining work, such as haulage and crushing, because the concentrator is the start of our process. MVC works with high throughput volumes as a countermeasure to the low grades to make our project profitable.

Are you thinking of expanding your model to other mines?
With the structural strengthening of copper prices and the difficulties in maintaining production, the reckoning of working with tailings will become more evident to producers, and Amerigo Resources is the company of choice in this sector. ■

JM



CM

John Mackenzie and Cashel Meagher

JM: Chair of the Board

CM: CEO

CAPSTONE COPPER

Can you outline the main achievements of Capstone Copper recently?
JM: We achieved record copper production and EBITDA generation in 2024, representing strong growth. During the year, we realized the first phase of the transformation of Capstone Copper (Capstone) by ramping up Mantoverde and Mantos Blancos while improving our balance sheet strength and financial flexibility. As operations ramped up, we advanced future growth phases by releasing feasibility studies for Mantoverde Optimized project and the neighboring Santo Domingo project.

Consolidated copper production increased by 12% in 2024, primarily driven by the ramp-up of the Mantoverde Development Project (MVDP). This project added a 32,000 t/day sulfide concentrator and a tailings storage facility. The first copper concentrate was produced in June, reaching commercial levels by September and full rates by year-end. Meanwhile, at Mantos Blancos, we unlocked mill capacity through a successful debottlenecking.

What is Capstone Copper's approach to sustainability?
JM: Our target is to reduce total GHG emissions from fuel and power by 30% by 2030. We are developing and executing decarbonization strategies through several initiatives, including adding more renewable power to our energy mix, studying independent renewable energy generation alternatives, and displacing diesel consumption. At our Chile sites, we have been calculating Scope 3 emissions since 2021, and we hope to expand to our other sites this year.

What is in store for Capstone Copper in 2025?
CM: This year represents an inflection point for Capstone, with our recently released 2025 guidance demonstrating increased cash flow generation highlighted by continued copper production growth and decreasing unit costs. We have several key priorities for 2025. We intend to commence construction of the highly attractive Mantoverde Optimized project in the second half of 2025. This is a high-return, low-cost project that will deliver roughly 20,000 t/y over an extended 25-year mine life for a capital cost of only US$146 million. ■

Kathy Uribe

Senior Director and Head of External Affairs

ALBEMARLE

> "We value the fact that lithium has become a central pillar of Chile's national strategy."

What progress has Albemarle made in Chile over the past 12 months?
We successfully consolidated operational and safety improvements made in prior years, leading to record production levels at both the Salar de Atacama and La Negra sites. One of the most impactful initiatives was our cost reduction program, which lowered costs by over 15% and delivered more than US$50 million in savings. These gains were driven by a robust portfolio of improvement projects implemented across our operations.

How does Albemarle plan to maintain its leadership in the global lithium market amid new entrants?
In Chile, Australia, China, and the US, we offer a diverse portfolio that includes both battery and technical grade lithium products. Our strategy focuses on consolidating existing assets, optimizing operations, and reducing the capital intensity of future growth. This is supported by high-quality, low-cost resources—whether it's our brine assets in Chile or our hard rock operations in Australia—which allow us to maintain a competitive and sustainable position over the long term.

What is Albemarle's strategy following Chile's decision to open more salt flats for exploration?
We view the government's lithium strategy as a positive step toward securing Chile's leadership in this sector. Over 40 years ago, we were the first to develop the lithium industry in Chile with Corfo, and we are proud of our pioneering role at Salar de Atacama.

How is Chile positioned globally in lithium production, particularly concerning sustainability and geopolitics?
Chile remains a key player in the global lithium supply chain, and we believe its position will strengthen if it addresses key execution challenges. For Albemarle, sustainability is non-negotiable. Every project we pursue must meet high environmental and social standards. In northern Chile, where water scarcity is a serious concern, we are committed to applying technologies that minimize freshwater usage. Our capital investments are designed with recovery systems, energy efficiency, and long-term environmental impact in mind.

As part of this commitment, Albemarle became the first lithium producer—and only the third mine site globally—to have an audit report published under the Initiative for Responsible Mining Assurance (IRMA), reflecting our dedication to transparency and continuous improvement.

Chile has a significant opportunity to lead, thanks to its resource base and infrastructure, but permitting, execution, and sustainable operation will be the differentiators. We believe Chile can maximize its lithium potential over the next decade, but this requires a strategic view.

What importance do Albemarle's apprenticeship programs and gender inclusion initiatives have in Chile?
At Salar de Atacama, approximately 30% of our workforce comes from local indigenous communities. We are also making steady progress in gender inclusion. Female representation has grown from 15% to nearly 20% over the last few years, and our executive team has gender parity.

What would you like the incoming Chilean government to prioritize in lithium policy?
We value the fact that lithium has become a central pillar of Chile's national strategy. What we hope to see from the next government is a continuation of that focus, along with faster and more predictable permitting processes. To align with global demand for electric vehicles and energy storage, we need to move now on projects that will come online in 5 to 10 years.

Is Albemarle developing Direct Lithium Extraction (DLE) technology internally or through partnerships?
Over the past decade, we evaluated many potential technologies for DLE at Salar de Atacama. We are now piloting the most promising options at our US$30 million facility in La Negra, one of the most advanced pilot plants globally. Our approach is resource-specific, and we are not just adopting technology but adapting it to the unique characteristics of Salar de Atacama. We are now in the final phase of optimization, and the focus is on building a complete, sustainable, and efficient system, not just an extraction process.

What are Albemarle's key priorities and projects in Chile for 2025 and beyond?
Our top priority is to consolidate recent expansions at La Negra and Salar de Atacama. We are focused on maximizing efficiency and yields, continuously improving safety, and lowering operating costs. In Chile specifically, our major initiative is the flexible and scalable implementation of DLE operation at Salar de Atacama pending permitting and community collaboration. ■

EXPLORATION

> Chile is a historic mining district and one of the premier places for mining investment, which makes it a very comfortable place to do business.

Wojtek Wodzicki
President and CEO
NGEX MINERALS

Image by Marek Piwnicki at Pexels

Copper Exploration

Just as the dust settles, new concession updates force a rethink

The brownfield expansion sweeping Chile over the next decade can be attributed to the investment and expansion of large multinationals, for whom surging copper prices have provided incentives for undertaking such ambitious projects. However, with juniors having to rely solely on financial markets and investor sentiment, Chile has not yet seen its greenfield project pipeline fill up for the years to come, due to high exploration costs, difficulties in finding economically viable deposits, and lengthy permitting times.

There is, however, still hope for Chile's exploration companies, as the country led in copper exploration investment in 2024, representing 27.4% of the global figure. Experts predict that this US$637.4 million investment will rise in the years to come, suggesting an exciting time for the greenfield in Chile, as investor confidence has already started to return in the first months of 2025.

Fitzroy Minerals owns three exploration projects in Chile, with plans to drill all of them in 2025. Merlin Marr-Johnson, CEO, is confident in the country, commenting: "I have worked across Latin America, and I can say that Chile is hands-down the most logical place to invest in mining in South America, if not the world. Argentina is moving in the right direction, but there is still not a mining culture, and there are similar problems with community relations there as in Ecuador."

Last year, Fitzroy purchased the Buen Retiro copper project and, as part of the process, raised C$3 million to conduct 8 km of drilling at the property.

Listing in October 2024 on the Canadian Securities Exchange, Super Copper is one of the newest junior companies vying to reach development, with 74,000 hectares near Copiapó, one of Chile's premier historic mining districts. Its flagship Cordillera Cobre project has returned 45 samples of between 1% and 10% copper concentrate, demonstrating the potential of their project. In addition to this, the company recently received a US$1 million investment from the Apeiron Investment Group as Super Copper looks to advance with further drilling and exploration programs.

The company has also entered into a JV with MetaFlo Technologies to enhance its exposure across the mining value chain and diversify its potential sources of income, all whilst remaining focused on copper exploration. "Enhancing closed-loop water systems and remediation are areas with great potential. MetaFlo Technologies has been working with chemicals for industrial applications for a long time, particularly for tunneling and soil solidification, but last year, they started working on a project for gold processing. So, we teamed up and put together their chemical team with our network of relationships to focus on copper," outlined Zac Dolesky, Super Copper's CEO.

Other junior companies, such as Altiplano Metals, are also relying on other sources of income. Altiplano owns and operates the El Peñón Mill, which has generated sales from concentrates of gold, copper, and an iron byproduct. "Having an income source makes us unique, as most juniors rely on equity markets to survive. This has been the model of junior mining since its inception, and recently, this has come under scrutiny because if you cannot raise money, the future of the company can be in doubt," observed Alistair McIntyre, Altiplano Metals' CEO, continuing: "A source of income has helped us invest in projects, grow our company, and manage our business, paying wages, bills, and the fees associated with the capital-intensive industry that mining is."

Alongside the mill, Altiplano Metals is also beginning drilling on the Santa Beatriz property and has purchased two new projects in the past 12 months. "With new mining concession laws in Chile, companies are looking harder at whether they want to keep a project or not. With project information increasingly in the public realm, it helps the right team explore them and helps the entire value chain become more involved in projects," added McIntyre.

The concession laws he is referring to are updates to Law 21.420, approved during the last months of Sebastián Piñera's government to disincentivize landholding without conducting meaningful exploration. The updates to the law also increase concession licenses to last for four years and require junior companies to report all geological data to the relevant government agencies.

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Image by Max Tcvetkov at Unsplash

Finding New Copper Deposits

"A property like Tolita, previously drilled only to shallow depths, could potentially host a massive porphyry system beneath the original target zone. The shift in commodity prices and exploration philosophy has created a new opportunity."

Isaac Maresky, CEO, **GOLD HART COPPER**

"A lot of the changes seen in investor sentiment are being driven by critical minerals policies and increased public knowledge of mining. With all the discussion surrounding critical minerals in the last five years, the general public is starting to see that mining is needed both for our daily lives and decarbonization."

Paul Gow, CEO, **TRIBECA RESOURCES**

"Our strategy is focused on building a resilient business that can thrive through commodity cycles. Long-term demand fundamentals remain strong, driven by electrification, infrastructure, and energy transition trends."

Zac Dolesky, CEO, **SUPER COPPER**

"We see a myriad of price upside catalysts, stemming from the energy transition, but also because of a deficit on the supply side. Many mines are near the end of their life or mining lower grades than when they started."

Jay Chmelauskas, CEO, **CAMINO MINERALS**

"2024 was another challenging year, but no industry is better than mining for understanding risks. We operate in an environment that requires focus, particularly around things out of our control, for example, commodity prices and geopolitical risk."

Alastair McIntyre, CEO, **ALTIPLANO METALS**

"The importance of minerals evolves over time. For example, two decades ago rare earth elements and lithium were not critical commodities yet today they are indispensable for modern technology."

Antony Harwood, President and CEO, **MONTERO MINING**

"When looking at the best way to create shareholder value, there has to be a balance between risk and reward. With two very early-stage, undrilled prospects, the board of Fitzroy Minerals decided to derisk the company by acquiring the private Ptolemy Mining."

Merlin Marr-Johnson, President and CEO, **FITZROY MINERALS**

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Marimaca Copper is currently working on the DFS of its Marimaca Oxide Deposit, touted to be one of the most capital-efficient copper projects in the world. "Previously, low holding costs allowed many private landowners to sit on concessions without doing any work. This prevented juniors from accessing promising areas unless they paid significant premiums," explained Hayden Locke, CEO of Marimaca Copper, which has obtained impressive results at Pampa Medina.

Whilst the law may result in larger companies offering up more deposits for purchase by juniors and increase transparency in exploration, it could price out the smaller companies as it raises their concession fees by 300-400%. "Rather than supporting the growth of the industry, this law threatens the survival of small-scale mining, a sector that not only generates jobs but also plays a vital role in the discovery of new mineral deposits," argued Manuel Viera Flores, president of the Chilean Mining Chamber.

Others in the industry believe the law threatens small-scale geologists, who play a vital role in discoveries. "Previously, a single geologist could afford to stake and retain a property for years in anticipation of eventual interest. Now, these individuals may be priced out. There must be a balance in regulatory design. While it is important to prevent property hoarding and ensure that concessions are developed, the system must also remain accessible to individual geologists," argued Isaac Maresky, CEO of Gold Hart Copper.

Gold Hart Copper began exploring the Cachitos project and has since consolidated several additional properties in the area.

The Avispa project, owned by Montero Mining, has already felt its impact. Since purchasing the land in 2020, the company has reduced the land package from 500 to 220 km2, driven by the cost of holding licenses in Chile. "Many of the easily accessible deposits have already been developed, meaning exploration for more elusive deposits is both costly and time-consuming. With licensing fees now significantly higher, smaller companies struggle to sustain large land holdings. Previous exploration strategies of acquiring larger land packages initially and reducing them over time based on exploration results are not as easy anymore," explained Montero Mining president and CEO Anthony Harwood.

However, he sees the alterations more as an opportunity than a threat moving forward. "Companies of all sizes have been forced to relinquish property due to increased holding costs. This has prompted major mining firms to reassess their portfolios, leading to the sale of lower-priority assets - an opportunity for junior miners looking to acquire new projects," he elaborated.

Celebrating its 15th anniversary in 2025, Hot Chili is looking to transition into development thanks to its Costa Fuego project, which is expecting a finalized PFS to be released soon. The company has also made exciting discoveries at its La Verde project, aiming to keep exploration as a core part of the business even as it moves towards having an asset in development. "The first drilling program yielded results at 174 m of 0.4% copper and 0.2 g/t of gold. In the second drill hole DKP002, we found copper showing at a significant intercept of 308 m with a grade of 0.5% and 0.3g/t of gold. So far, we have conducted 27 drill holes to depths up to 350-400 m, with promising results starting from 28 m depth below the gravel cover. One of our drill holes is 362 m deep, presenting a grade of 0.3% Cu and 0.1g/t from 28 m onwards, which has a great growth potential and ended in mineralization," highlighted Andrea Aravena, Hot Chili's geology manager.

Hot Chili is optimistic that the updates to the concession law will encourage more greenfield and junior exploration in Chile. José Ignacio Silva, country manager and chief legal counsel, said: "These laws are essential as major mining companies hold too many land rights, which remain unexploited, impeding juniors' access to certain zones, creating dysfunctional incentives. These laws create incentives for major companies to dispose of these unused lands."

Tribeca Resources has already benefited from the updates on the law, purchasing the Chiricuto project near Capstone Copper's Mantoverde and Santo Domingo properties. Tribeca Resources is looking to become a multi-asset company in Chile, and the concession law updates are aiding the company in this pursuit. "Over the last couple of years, we have seen many groups moving to reduce the size of their exploration property portfolio through divestment. We have looked at around 130 projects in detail with the objective of increasing our portfolio through the acquisition of quality projects. We acquired an option on the Chiricuto project in March 2024, and the project potentially became available because the private owners of the project were looking for assistance with the increased holding fees. We aim to acquire another property this year, potentially from what some of the majors are relinquishing or divesting," outlined Paul Gow, CEO.

After recently purchasing the shovel-ready Puquios mine outside of La Serena, Camino Minerals is well in the race to become Chile's next producer. With an all-in sustaining cost of US$2/lb, the project is set to remain profitable even if there is an unexpected downturn in the copper price. The new concession laws present a great opportunity for companies such as Camino Minerals to grow even more within Chile. Jay Chmelauskas, outlined: "Once we are producing in Chile, we will be in a stronger position to acquire new land, and our strategy is to go after projects that can be built in a reasonable amount of time, like Puquios. These kinds of projects, we believe, can be built within a five-to-ten-year period."

A great advantage of mining in Chile is the public trust it enjoys. The Brújula Minera Study Center found in a 2024 survey that 83% of respondents believed the Chilean mining industry had a positive impact on the country. "This shift in popularity is excellent news for Chile and the mining industry, presenting a historic opportunity to increase its copper production by approximately 2 to 3 million t over the next 10-15 years. This would have a transformative socio-economic impact across the country, as the mining boom in the 1990s and early 2000s played a crucial role in Chile's economic development," said Santiago Montt, CEO of Los Andes Copper.

Los Andes Copper has focused on community relations throughout 2024 to advance its 183,000 t/y Vizcachitas project in Putaendo toward development. It launched extensive initiatives in 2024, including biodiversity conservation and compensation projects, hoping that when ready to start permitting, the Vizcachitas project will have widespread community support. "In many other jurisdictions, regional governments actively compete to attract investment, whereas Chile often sees local authorities opposing projects regardless of political orientation. The key to resolving this challenge is ensuring that economic benefits from mining projects reach regional and local governments more effectively and promptly. Looking at global examples, Brazil provides a compelling model where states and municipalities actively compete for investments," continued Montt.

There are many methods available for juniors and exploration companies to ease the path towards production. Companies exploring in Chile are looking to fully exploit all of these avenues to capitalize on record metal prices and provide the next generation of mining deposits for Chile. Despite having been a quiet year in terms of regulation, updates to the concession laws still grabbed headlines.

Vicuña takes center stage

A landmark collaboration was announced at the beginning of 2025 between Lundin Mining and BHP, which acquired a large land package in the Vicuña district that straddles the Argentina-Chile border. The acquisition includes the Filo del Sol and Josemaria projects, and both companies will control 50% ownership of the newly created Vicuña Corp, which will operate these properties.

"We expect the Vicuña project to become one of the largest copper projects in the coming decades. Having BHP as our partner in this project is a strong validation of our confidence in copper and its future demand," outlined Juan Andrés Morel, vice president of operations for Lundin Mining.

Since the announcement of the project, the newly formed Vicuña Corp has announced results far beyond expected, becoming the largest copper discovery in almost 30 years. The resource base has been estimated at 14 million t of copper, 32 million oz of gold, and 659 million oz of silver, impressive results for a gold and silver mine, let alone for a mine with those precious metals only as a by-product.

NGEx Minerals is a junior company bullish on the future of the Vicuña district. In Chile, NGEx owns Los Helados, a project located about 17 km from the producing Caserones mine. The project is significant in size. Just across the border in Argentina, NGEx Minerals owns the Lunahuasi land package in San Juan, one of the most exciting copper-gold-silver projects currently being explored in the world, winning the PDAC Discovery of the Year award in 2024.

Despite the relatively recent fame of the region, many years of effort have gone into developing what may be the next premier mining district in South America. "It is easy to think of the Vicuña district as something that just sprang to life recently, when in fact it is the result of 20 years of investment through thick and thin. In a long-term business such as mining, you cannot let daily or even yearly metal prices influence your decisions. Much of the success we are enjoying today is because of investments made during tougher times decades ago," emphasized Wojtek Wodzicki, president and CEO of NGEx Minerals. ■

Wojtek Wodzicki

President and CEO

NGEX MINERALS

Can you provide an update on NGEx Minerals and your projects?
Lunahuasi, located in San Juan, Argentina, is one of the world's most exciting high-grade, copper-gold-silver discoveries. It has garnered a lot of attention due to the grades being hit, which are atypical for the district. This began with the discovery hole we drilled about 18 months ago, intercepting 60 m of 7.5% copper equivalent (CuEq). Through Phase 1, 2 & now 3 drill programs we have been able to delineate a mineralized area of 1 km north-south, 1 km east-west, and 1 km vertical, which remains open in all directions and continues to show continuation of extremely high-grades. If this was purely a gold deposit, the intercepts would be world-class, but coupled with the copper and silver, we believe we are only scratching the surface at likely the most exciting exploration project globally.

Our Los Helados project on the Chilean side of the Vicuña district is located about 17 km from the Caserones mine, owned by Lundin Mining, and is more advanced than Lunahuasi. More drilling, around 100,000 m, has been completed at Los Helados and a large resource has already been defined (roughly 2 billion t at 0.52% CuEq and an additional 1 billion t of inferred resource). There are potential synergies between the two projects providing a viable development scenario for Los Helados in the future.

What advice would you give to juniors struggling in the current financial climate?
I think the determining factor to financial success is the project. This gives you access to capital and has the potential to capture investors' attention.

What are your plans for NGEx Minerals in 2025?
Our focus will be on Lunahuasi in the coming year. We are in the middle of a 25 km drilling program that's roughly 50% complete and plan to continue drilling until weather forces us to stop, likely in May. ■

Hayden Locke

CEO

MARIMACA COPPER

What are the major highlights for Marimaca Copper over the past 12 months?
Our primary focus has been advancing the Marimaca oxide deposit, mainly regarding the permitting process. We submitted our environmental impact study application, which has been accepted by the government, representing a significant milestone. Simultaneously, we have been working to finalize our Definitive Feasibility Study (DFS). It will confirm Marimaca as one of the most capital-efficient copper projects globally. The recent results at Pampa Medina are also very exciting, revealing the geological potential to extend the project.

How has your experience with Chile's permitting process been?
Our experience is very positive. Many companies complain about permitting delays in Chile. However, we submitted a very high-quality application backed by robust data, and the government has been highly engaged and responsive, receiving the first round of questions within the 45-day window after our application. We hope to receive environmental approval by the end of 2025.

How have increased concession costs impacted your exploration strategy?
Costs have increased approximately 400%, and now we are more selective about the tenements we choose to retain. But I believe this reform will be positive for exploration in Chile. Previously, low holding costs allowed many private landowners to sit on concessions without doing any work. This prevented juniors from accessing promising areas unless they paid significant premiums.

How does Pampa Medina integrate with your existing operations?
Using existing infrastructure is always value-accretive. We are exploring that for Pampa Medina. Preliminary estimates suggest that Pampa Medina could add 20,000 to 25,000 t/y of copper cathode production over 12 to 14 years. That would increase our profile from 50,000 t/y, as modeled in the DFS, to as much as 75,000 t/y, positioning Marimaca as a globally significant copper producer. Furthermore, recent drilling has extended the length of the mineralized horizon by approximately 400 m, potentially doubling the resource. ■

Santiago Montt

CEO

LOS ANDES COPPER

What key achievements and challenges have you encountered over the last year?
2024 was an important year for us, particularly in advancing the social license for the Vizcachitas project. We made significant progress in community engagement through flagship initiatives such as the female entrepreneur and social organizations programs, which provides training and seed capital for women and social organizations in Putaendo. Establishing meaningful connections with local stakeholders is an essential part of what we do at Los Andes Copper.

Additionally, we have initiated collaborations with land-owning communities in the Putaendo county to explore biodiversity conservation and compensation projects. Our objective is to ensure that by the time we file our environmental impact assessment, the Vizcachitas project is well known and widely supported and delivers both social, economic and environmental value to local communities and the region.

What are the main objectives for Los Andes Copper in the coming years?
Our goal is to ensure that Vizcachitas progresses through its various project phases responsibly and sustainably, while also positioning it as a key contributor to Chile's next wave of copper production growth. ■

José Ignacio Silva

Country Manager and Chief Legal Counsel

HOT CHILI

Can you discuss your most recent developments at Costa Fuego?
Costa Fuego is one of only a few large-scale copper projects in the world that has short timelines to production. Our PFS at both our mining and desalination projects has been finalized. The latter is a key infrastructure project that generates not only economic, but also social benefits, garnering us community support.

The results from the mining PFS in Costa Fuego were very positive, increasing mine life by four years and the free-cash-flow by US$580 million, but the downside is that it also increased the start-up by US$220 million. The mine will feature a long-term copper value of US$4.3/lb, a 19% return rate, a cash flow of US$3.86 billion, and a payback of four and a half years. Annual primary production in 14 years is 115,000 CuEq t/y, with a production of refined copper of 95.000 t/y, 48,000 oz/y of gold, 2000 t/y of molybdenum, and some silver. The cash cost is US$1.38/lb of copper. The expected project life is 20 years, with 2,000 workers now, and 800 expected during the mine's operation.

How is progress at La Verde?
La Verde is quickly growing. We have an offtake with Glencore for 60% during the first eight years of the mine's life. ■

Merlin Marr-Johnson

President and CEO

FITZROY MINERALS

Can you provide an update on Fitzroy Minerals and introduce your projects?
Our most advanced project is Buen Retiro Copper, near Copiapó and the Candelaria mine. There was an open pit oxide copper mine at Buen Retiro, and the project is at a low elevation with good road and power infrastructure. After drilling 4,000 m in Phase 1 drilling, with good results, the plan is to drill over 8,000 m in 2025. Polimet, in the historic Petorca mining district, is a gold-copper-silver project with a 2,500 m Phase 1 drill program underway.

The third project is the Caballos Copper project, a greenfield project with two large anomalies along a regional fault zone. We drilled a 350 m long proof-of-concept hole in the southernmost anomaly called Chincolco, and we have reported an intercept of 186 m of sulfides, and within this, there is 73 m of more intense mineralization.

What is next for Fitzroy Minerals?
Our priority for 2025 is simple: to drill and discover resources. We have access to about US$14 million before we need to go back to the market. We have three great projects and will continue drilling all of them in 2025. Exploration companies succeed when they have momentum, are well-backed, and make intersections, placing themselves at the front end of the Lassonde Curve. ■

Beyond Copper Exploration

Light at the end of the tunnel for Chile's junior companies

The future of mining in Chile appears bright, with massive investment flows forecast for the immediate future. However, the outlook may be bleaker for exploration companies, especially those not focused on copper. According to Cochilco, only 18% of the expected investment will be allotted to greenfield projects, with US$15.2 billion divided among 15 projects, compared to 35 expansion projects amounting to more than four times that figure. Of these, 54.3% are copper exploration and 11.5% are related to gold, with lithium and rare earths representing a minor share of the greenfield sector.

Nonetheless, even if the outlook remains challenging, many companies are starting to notice a more positive sentiment towards junior companies in financial markets. Moreover, technology is evolving, optimizing junior's operations and making them more sustainable and successful, which is catching the eyes of investors.

Lithium: Navigating challenges, embracing innovation

While a few years ago, the world was in the midst of a lithium rush, doubts about electromobility and energy transition, global turmoil, political decisions, and a rising supply of the mineral contributed to lower prices, affecting producers and diminishing investors' appetite for lithium. Juniors are forced to devise strategies to try to lure investment. Adoption of new technologies has helped enormously in this regard, namely Direct Lithium Extraction (DLE), allowing for faster production without needing a larger amount of water. "DLE offers a more environmentally responsible alternative to traditional evaporation ponds. We believe DLE will become the standard across the industry, and we intend to be at the forefront of its adoption," commented Steve Cochrane, CEO of Lithium Chile.

Government-backed initiatives have also been important in holding a lifeline to the sector. In Chile, the new National Lithium Strategy is aimed at boosting and reshaping lithium extraction. The Strategy not only opens up new areas to explore but also intends to position Chile as a key player downstream of the value chain while sustainability concerns are taken into great consideration. To do so, the Strategy allows for public-private cooperation through extending the role of Special Lithium Operation Contracts (CEOLs).

Lithium Chile was granted one of the CEOLs together with Grupo Errázuriz at the Coipasa Basin, underpinning the benefits of cooperation. "Our JV with Grupo Errázuriz was key. Together, we controlled more than 97% of the claims in the salar. That level of basin control was a prerequisite for applying under the fast-track CEOL framework under the National Lithium Strategy," Cochrane affirmed.

Nonetheless, the process to obtain a CEOL is competitive and complex, and many companies have faced rulings that they felt were unfair. This is the case of Ignacio Mehech, CEO of CleanTech Lithium. He remains confident that the government will approve the appeal and grant CleanTech a CEOL, making its Laguna Verde project, which incorporates DLE, a key component of its Strategy. "We are very confident in this government and their strategy for lithium," he said, adding, "There is an opportunity for an integrated BEV supply chain in Latin America, as seen through the Chilean public sector partnering with companies like Albemarle and SQM, as well as greater incentives provided for downstream collaboration in Chile."

Ignacio Mehech
CEO
CLEANTECH LITHIUM

> We are very excited about the National Lithium Strategy, as it is the first time in two decades that there is an opportunity for junior companies and new entrants into Chile's lithium market.

Thus, despite the industry enduring a period of induced lethargy due to low lithium prices, the first glimmers of hope are appearing. The sector is confident in the momentum the National Strategy is giving it, in its sustained relevance regardless of electoral outcomes, and in the inexorability of the energy transition, which will hopefully drive prices up and with them investor confidence.

The broader outlook

Chile is endowed with a myriad of different metal deposits. Despite each mineral faring differently regarding price trajectories, they have all experienced the same financial constraints concerning availability of investment, but the outlook is brightening again.

Aclara Resources is a rare-earth exploration company that has devised, in collaboration with the University of Toronto, the Circular Mineral Harvesting technology, which allows for the extraction of rare-earth minerals, mainly dysprosium and terbium, from clay deposits while recycling 99% of the chemicals used and almost all the water needed for the process. Like most companies, Aclara faced some difficulties recently. Nelson Donoso, Aclara Resources' general manager, explained: "Being a project developer has its difficulties. Developers invest heavily before obtaining any environmental approval or revenue. For example, two years ago, Aclara was investing around US$25 million annually; now it is closer to US$10 million per year."

But behind each hindrance lies new opportunities, with Donoso pointing to the need to find stable partners to surmount financial difficulties. "Automakers and other industrial players are now much closer, showing strong interest in securing a sustainable rare earth supply. We have engaged with globally known automotive companies, all of whom are concerned about future supply chains dominated by China," he said.

Cobalt is also poorly valued, with low prices affecting companies mining it. "Factors such as the COVID pandemic and short-term cobalt overproduction in the DRC and Indonesia have led to price volatility and a more cautious development approach," affirmed Duncan Blount, CEO of Chilean Cobalt, which owns the La Cobaltera project, historically one of the few mines globally to have cobalt as its primary mineral.

The expectation is for metal prices to rise again, pushed by decarbonization processes, but sustained thanks to enhanced investor confidence. Part of this optimism is due to the importance that many of these minerals will have in the energy transition. Blount commented: "What has brought the majority of investor interest to our project is that cobalt is listed on every country's critical minerals list, and the US has to import the majority of it."

Not even gold has been spared from this trend in exploration, despite having enjoyed record-high prices. Tesoro Gold, owners of the district-scale Ternera deposit at El Zorro, has also had to adapt to limited capital inflows, despite resources currently amounting to 1.5 million oz and having made breakthrough discoveries at nearby Drone Hill. "It is unusual to use a spot gold price for project valuation. Projects are generally assessed based on a consensus long term gold price or one that is acceptable for financial institutions to form the bases for funding of the project. The current gold price is used for a valuation scenario, but not as a decision gate for the project. We have seen a significant increase in the gold price over recent times, but whether this is sustainable over the long term remains uncertain," elaborated Linton Putland, executive director, mining and development at Tesoro Gold.

While recent times might not have been the easiest for exploration companies, particularly regarding investor sentiment, the sector has demonstrated its robustness and resilience by weathering the storm. Technology has proven invaluable in this regard, streamlining operations and luring investors. Juniors should receive more support as they are key in generating new discoveries that will translate into future jobs and resources. The National Lithium Strategy is a welcome example of how cooperation between public and private actors can drive development and business, capitalizing on Chile's mining and geopolitical potential. But more efforts should be made, and financing made more available. Juniors should keep embracing new technologies. Despite having navigated turbulent times, exploration companies are starting to see the light at the end of the tunnel. ■

Image by Alexander Schimmeck at Unsplash

Steve Cochrane

CEO

LITHIUM CHILE

> The CEOL awarded to us in March is a landmark event not just for Lithium Chile but also for Chile's lithium sector.

What have been the major developments for Lithium Chile over the past 12 months?
In Argentina, our focus was on advancing the Arizaro project. We completed our PFS in July, which confirmed the strong economic potential of the asset. Shortly after, we received a letter of intent from an Asian party interested in acquiring the project.

In Chile, our most significant milestone has been the completion of a JV with Eramet on our Molle Verde project. During this time, we also introduced Eramet to the local communities where we have long-standing relationships. Eramet has committed to continuing that engagement as part of its operational philosophy, which emphasizes local collaboration. Their strong financial capacity and technical expertise will help us significantly as we advance Molle Verde.

What is the status and significance of the CEOL granted to Lithium Chile?
The CEOL awarded to us in March is a landmark event not just for Lithium Chile but also for Chile's lithium sector. Our JV with Grupo Errázuriz was key. They controlled about 36% of the Coipasa Basin, while we held 62%. Together, we controlled more than 97% of the claims in the salar. That level of basin control was a prerequisite for applying under the fast-track CEOL framework under the National Lithium Strategy.

Coipasa was identified as one of the first six salars eligible for private development, so we saw an opportunity and positioned ourselves accordingly. This approval validates the extensive technical, community, and regulatory work our team has done over the years. We are now in a position to begin detailed exploration and development at Coipasa.

What is your approach to Direct Lithium Extraction technologies?
Direct lithium Extraction (DLE) offers a more environmentally responsible alternative to traditional evaporation ponds. We have reviewed more than 30 DLE technologies. Each brine chemistry requires a tailored solution, so we are careful about selecting the right partner for each project. Our partner Eramet is also advancing a DLE pilot plant in Copiapó, which looks promising and may offer an in-country solution. We believe DLE will become the standard across the industry, and we intend to be at the forefront of its adoption.

How do you view the current global dynamic, especially with China?
China is the world's largest consumer of lithium and is advancing rapidly in EVs and related technologies. From our perspective, building constructive relationships with China is pragmatic and necessary. China's technological expertise, particularly in lithium processing and manufacturing, cannot be overlooked.

What factors led to Lithium Chile's successful CEOL application?
The most important factor was basin control. By forming a joint venture with Grupo Errázuriz, we controlled 97% of the Coipasa claims. The government was able to work with a single, coordinated group, which simplified the regulatory process. Our operational track record also helped. We demonstrated the ability to take a grassroots exploration property in Argentina and advance it to a PFS valued at US$2.8 billion. That experience gave the Chilean government confidence in our technical and financial capability.

What was the rationale behind spinning off Kairos Gold?
Our gold assets were not being properly valued within Lithium Chile. We had five promising gold projects, but investors were only focused on our lithium portfolio. We spun out Kairos Gold in December with shareholder and TSX approval. We raised US$1.4 million to fund exploration and launched a second drill program at Las Garillas.

How do you view the trend of increased collaboration in the mining industry?
The junior mining sector plays a crucial role in identifying and advancing early-stage assets. Majors typically come in once a resource has been defined. This division of risk and capital has always underpinned the mining ecosystem. These collaborations enable us to progress more projects without overstretching our resources. They also bring technical expertise and financial support, which is especially important in a sector as capital-intensive as lithium.

What are your goals for the remainder of 2025 in Chile?
Our primary objective is to advance the Coipasa CEOL. We are in discussions with the Ministry to finalize the terms and are also re-engaging with local communities to ensure continued support. Chile's CEOL framework has given us a production pathway ahead of confirming the full resource, which is unique. In parallel, we will continue to progress negotiations around the potential sale of the Arizaro project in Argentina. ■

Linton Putland

Executive Director, Mining and Development

TESORO GOLD

Can you summarize how 2024 and 2025 have been for Tesoro Gold?
In 2024 and 2025, we have remained focused on expanding and de-risking the Ternera Deposit at our El Zorro gold project in Chile, whilst also undertaking regional exploration activities on our extensive landholding. We have also advanced El Zorro to a development phase, with a focus on metallurgy, infrastructure and technical and financial assessments of the project.

What value does Gold Fields bring as a 17% shareholder?
Gold Fields investment and continued support of Tesoro validates our belief in the district-scale potential of El Zorro. Tesoro is working to align regional exploration activity with Gold Fields interests

What are your plans for the rest of 2025 and beyond?
We intend on updating the resource estimate incorporating new drilling at Ternera mid-2025. Following this will be an update of the 2023 Scoping Study based on updated inputs. Some Pre-Feasibility activities have commenced with the goal to complete the PFS and then move into a DFS. That will lead to project funding and a final decision to mine or commence development of the project. ■

Duncan Blount

CEO

CHILEAN COBALT

Can you provide an overview of Chilean Cobalt?
Chilean Cobalt is a US-listed (OTCQB: COBA) critical minerals exploration and development company focused on the La Cobaltera cobalt-copper project in northern Chile, one of the world's few primary cobalt districts. In 2018 and 2019, we launched the district's first modern exploration campaign, including comprehensive mapping, approximately 22 km of drilling, metallurgical testing, and preliminary mine planning for potential restarts. Since then, factors such as the COVID-19 pandemic and short-term cobalt overproduction in the DRC and Indonesia have led to price volatility and a more cautious development approach. However, the project's copper byproduct – currently trading near historic highs – has helped offset some of this pressure and supported our economic models.

What sets La Cobaltera apart from other greenfield projects in Chile?
Geologically, the district offers greenfield exploration potential adjacent to numerous historically productive brownfield sites. The project is ideally located, just 10 km from the coast, 15 km from the regional power grid, and 30 km from the Port of Huasco and nearby towns of Huasco and Freirina. ■

Nelson Donoso

General Manager

ACLARA RESOURCES

Could you update us on the recent performance of Aclara Resources and the Penco Module project?
Since we intend to begin construction as soon as we obtain the environmental approval, we have been advancing the feasibility engineering for the project. We expect to complete the feasibility study by the end of 2025.

Could you explain the 'Circular Mineral Harvesting' technology developed by Aclara?
Our project relies on the presence of ion-adsorption clay deposits containing rare earth elements, particularly dysprosium and terbium. In collaboration with the University of Concepción and the University of Toronto, we developed a very gentle chemical leaching process using only ammonium sulfate, a common fertilizer. Through an ion-exchange reaction, the clay releases rare earths in exchange for ammonium ions. We have patented this process, which allows for 99% recycling of the chemicals used and nearly complete recovery of the water.

Moreover, the residual clay enables us to rehabilitate mined areas with native forests rather than leaving behind a conventional tailings deposit. ■

ENGINEERING, CONSULTING AND CONSTRUCTION

“The demand for engineering services in mining is closely related to the technical challenges faced by mining companies. There has been a growing emphasis on technology and sustainability, which now accompany project development.”

Agustín Cabañas
CEO
R&Q INGENIERÍA

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Image courtesy of Glencore

Gearing up for Growth

Engineering firms look to cement their place in the mining boom

With the Chilean mining industry gearing up with record-setting levels of investment over the next year, the country's value and supply chains have never been so important, and engineering companies are gearing up to play an even bigger role in mining's future. To do so, companies are looking at diversifying services, aiming to become trusted partners for some of Chile's and the world's largest mining companies. With desalination plants, mills and concentrators being upgraded and introduced to meet the growing demand for copper, engineering could be on the precipice of a golden age.

Mario Baeza
Founder and CEO
RIO INDÓMITO

> Chile's regulatory framework is well-established, emphasizing environmental protection, community engagement, and sustainable practices. The government could integrate ESG principles more deeply, offering clearer guidance on sustainability reporting and incentivizing innovation in mining technologies.

This heightened demand is also being driven by global energy transition goals, with copper playing a critical role in electrification and renewable energy infrastructure. Chile's established reputation for high-quality deposits, combined with its stable operating environment, has made it a focal point for international investors seeking secure, long-term returns. Engineering firms are therefore not only expanding capacity but also investing heavily in technological upgrades, workforce training, and sustainability initiatives to align with the environmental and social expectations of both local communities and global markets.

It has long been a criticism of mining companies that not having proper partnerships with engineering firms leads to projects that run past the deadline and vastly over budget. One example of this was Teck Resources' recently inaugurated QB2 expansion, which came in at US$600 million over budget due to construction delays. "Projects tend to be most efficient when the company defining the business case executes the project. A partnership approach avoids loss of knowledge between contractors, increases accountability and streamlines communications," revealed Maria Paz Núñez Cristino, VP Chile for Australian-based engineering firm Ausenco.

In 2024, Ausenco's Chile office completed the Mantoverde optimization project on time and within budget, marking a significant milestone for the company's presence in South America.

To counter this, more partnership-based relationships between engineering firms and mining companies are being developed, with contractors entering the process from a project's initial stages and then often being involved right through its development. Rio Indómito aids mining companies in selecting their engineering and consulting firms, giving it a unique perspective on the hurdles both sides are facing. Mario Baeza, founder and CEO, noted: "Partnership-based relationships enhance project execution by fostering collaboration, transparency, and shared risk and reward. Moving away from purely transactional models encourages early contractor involvement, optimizing design, and reducing rework. These partnerships promote long-term value over short-term cost-cutting, ensuring better alignment of project goals."

Image courtesy of Candelaria

Santiago-based Metaproject works with majors like Codelco, Anglo American, Teck, and Barrick. By proving itself with such large companies and projects, Metaproject now has opportunities to expand to mining markets abroad. "We participated in major projects in Chinalco, Peru, as well as a greenfield exploration project in the Chaco region of Paraguay. We continued our work in Turkey, where the mining sector is highly dynamic, and we also entered Morocco, which has proven to be a well-organized country with great opportunities," said Manuel Viera Flores, the company's president.

JRI Ingeniería has been focusing mainly on EPC contracts in 2024, in the hopes of increasing efficiency by providing all these services together and creating stronger partnerships with construction companies to help win larger projects. "Our international expansion is largely driven by partnerships with local engineering firms in countries like Ecuador, Argentina, and potentially in places like Mexico and Peru. We bring our specialized knowledge in mining engineering to these markets while partnering with local companies that offer their strengths, such as in electrical or civil engineering. This collaborative model allows us to adapt to local conditions while still maintaining the high standards that JRI is known for," revealed Iván Rayo, general manager, JRI Ingeniería.

In 2024, global engineering consultants Wood underwent a large global restructuring of its 36,000 employees. One of the goals of this was to diversify their client base, allowing them to service smaller and midsize companies, making the company more well-rounded for the inevitable increase in the number of mines that will be developed in Chile to service demand for copper and lithium. "Our business has been mostly focused on design, engineering, and project execution. We realized, however, that if we can identify projects in the initial stages of exploration and development, there is work to do in estimating resources, mine planning, design, and conducting studies. These are the areas in which Wood offers the most value to juniors," said William Lilis, director of business development, minerals and metals, South America for Wood.

As well as diversifying its client base, Wood has also been adapting its geographical reach to new and emerging markets. Lilis commented: "Wood has also been expanding in the emerging market of Argentina with two offices in the country, and whilst up until now they have been focused on oil and gas, we are seeing an increase in interest in copper and lithium projects. Furthermore, we are looking into the Argentinian copper market with clients such as Rio Tinto, Glencore, and the BHP-Lundin Mining JV in Vicuña."

Celebrating its 50th anniversary in 2024, LEN Ingeniería is expanding and enhancing its offerings, looking to fill gaps outside of mining companies' traditional expertise to obtain more long-term partnerships with the industry's key players.

The company reported a more subdued project environment in Chile, a symptom of the need for mining com-

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Severino Modena
General Manager
METÁLICA CONSULTORES

> The future trend is that most of the existing open-pit operations will turn into underground mines. Construction of underground operations could take over 10 years, so it is about time to start looking at this now.

María Paz Núñez Cristino

VP Chile

AUSENCO

> I see opportunities everywhere, from greenfield projects to sustaining capital projects, where even a small percentage of recovery can yield substantial benefits for mining companies.

What key milestones has Ausenco achieved in Chile over the past year?
Completing the Mantoverde project was an exciting milestone for us in 2024, and also set a new benchmark for Chile's mining industry. The project was a team effort in every sense of the word. We led the work from our office in Chile and were supported by technical experts in Australia and Canada. This integrated approach brought together the best minds to find the right solutions. This project also added to our 15-plus years of uninterrupted project execution across the region. We are very proud of the efficient and optimized design we delivered to Capstone Copper – truly a world-class project.

What strategies have helped address current mining challenges in Chile?
The mining industry today is facing numerous challenges, including mineral hardness, increasingly lower grades, and water availability. We consider these factors, and we approach every project with a focus on efficient and sustainable practices from early stages, such as concept studies through to commissioning and operation, to deliver the best outcomes for our clients. Since its inception, Ausenco has always focused on reducing the carbon footprint of a project, ensuring a reduction in the environmental impact, and maximizing the return on investments for our clients around the world.

What factors led to the Mantoverde project being delivered on time and on budget?
Being involved in the Mantoverde project from very early stages gave us the ability to define and scope the project more effectively. Projects tend to be most efficient when the company defining the business case executes the project. This partnership approach avoids loss of knowledge between contractors, increases accountability, and streamlines communications.

In addition, we also had a strong and transparent relationship with Capstone Copper and our contractors. These relationships were pivotal to the success of the project.

What initiatives has Ausenco launched for workforce development and training?
One of the major problems we will face in the industry in the coming years is a lack of human capital, especially considering that several important projects are expected to get a green light and run on similar timelines. Here at Ausenco, we have strong professional development programs to support our talent. We also have a robust graduate program that focuses on attracting and developing new talent. In addition, internal initiatives like Women@Ausenco provide mentorship and support to our female talent within our organization. While we have a good representation of women, our focus is to create an environment where we can develop and support that talent. We want to maintain engagement across the organization and ensure people see real opportunities for professional growth and development here at Ausenco.

What more can be done to increase women's participation and leadership in mining?
The industry has made some great progress regarding women's participation, but there is still much more work to do. I believe we have a collective responsibility to show the broader community the benefits and positive outcomes that can be realized when women are involved in different sectors. We need to move beyond our microsystem and be able to make a real contribution to society.

Where do you see growth opportunities for Ausenco in 2025 and beyond?
We are emerging from a period where investment has largely stagnated. However, with today's copper prices and the current economic climate, mining companies can no longer afford delays in their investments. I see opportunities everywhere, from greenfield projects to sustaining capital projects, where even a small percentage of recovery can yield substantial benefits for mining companies.

In this context, we remain committed to supporting our clients from the earliest stages of project development. A clear example is our ongoing collaboration with Capstone Copper on the Santo Domingo study. In the past, mining companies would often engage different firms at each stage, resulting in cost overruns and repeated re-evaluations. Today, we are seeing stronger, more integrated relationships between mining companies and their partners.

Following our successful work at Mantoverde, we are now advancing engineering at Santo Domingo and we look forward to continuing through detailed engineering, construction, commissioning, and beyond, helping to deliver a project ready to perform. ■

Luis Soruco

General Manager Chile and Peru

ARCADIS

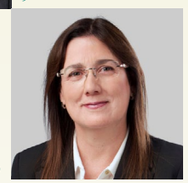
Can you give us an update on milestones for Arcadis in Chile?
We transitioned from a period where investment was quite slow to an acceleration that began in early 2023 and advanced swiftly into execution stages throughout 2024. The proportion of services we provide from the consulting side shifted from analyzing and doing trade-offs to rapidly executing projects for construction as soon as possible. There was a very strong click at the beginning of last year, driven by higher commodity prices and stronger demand.

What other important developments have you seen in the industry?
First is a much more robust level of standards in mining, especially those coming from GISTM and ICMM. The second is that we are concretely seeing decarbonization studies of mining operations. Mining companies quickly migrated to renewable energy contracts to change their energy matrix 100%.

Can you describe the services Arcadis offers and which are most in demand in Chile's mining sector?
Our services range from Environmental Impact Assessments (EIAs) to specialized engineering tailored to EIA requirements. We work on mining process plants, ancillary infrastructure, and tailings facilities. In these areas, we are developing innovations to enhance the efficiency of tailings management, whether through reuse, volume reduction, or minimizing water consumption.

How is Arcadis preparing for Cochilco's projection of more than US$83 billion in investment in Chile?
One of the key strategies for preparation is expanding Arcadis's global collaboration. The industry—particularly in Chile—is facing a major challenge: there simply aren't enough professionals available locally to meet the growing demand for project development. Currently, we collaborate with around 50 professionals from Peru and 10 to 20 from Brazil. In Chile, we have a team of 490, and we bring in an additional 50 to 100 professionals thanks to remote work technologies. This model allows us to seamlessly integrate talent from Panama, Mexico, Peru and Brazil into our operations. ■

JR



CP

Juan Ignacio Ríos and Carolina Páez

JR: General Manager
CP: Mining Manager

WSP CHILE

Can you give us a general update on WSP in Chile and the mining division?
CP: The growth of last year in the mining area is outstanding internally in Chile, with expansion into areas such as mine closure, including the development of pre-feasibility engineering studies for the closure of four large tailings storage facilities (currently in operation), located in different regions of the country. We are very consolidated in tailings design and associated works, including geomechanics and geoscience.

What role does WSP play in developing sustainable and safer solutions for tailings and water management?
JR: We are proud to be the designers of Anglo American's Hydraulic Dewatered Stacking (HDS) project at El Soldado. We are now moving into the next stage of HDS, working to expand the application of this technology.

How does WSP prepare and retain qualified personnel and promote diversity, especially for women in mining?
JR: Attracting and retaining talent is a permanent strategic focus. We prioritize making people feel comfortable and supporting their professional growth. We maintain close ties with universities to attract young talent and actively seek experienced professionals from the market. Retaining talent is challenging, particularly against strong competition from mining companies, but we have managed it successfully.

What growth plans and strategies does WSP have for Chile and the mining division?
JR: In Chile and Argentina, we have achieved continuous growth since WSP entered the region. Our strategic plan is solid, and for 2025, we are integrating digital growth initiatives as part of our ongoing strategic evolution.

CP: The strategic plan for Chile and mining rests on growing mining processes, infrastructure, and mine closure services. We are expanding large capital projects capabilities with the support of our Australian colleagues, whose deep expertise enhances our delivery capacity. ■

Agustín Cabañas

CEO

R&Q INGENIERÍA

> Strengthening our capabilities to handle larger volumes of work is critical, especially given the scale of upcoming projects.

Could you provide an update on the last 12 months at R&Q Ingeniería?
Over the last year, we have grown approximately 10% in the delivery of services to the mining industry. We consolidated our presence by completing major projects such as Quebrada Blanca, where we were part of the execution team working alongside Bechtel. Furthermore, we returned to Chuquicamata Underground to work on the new exploitation levels, which are an emblematic project for global mining. We are also strongly involved with the expansion of Collahuasi. Internationally, we are involved in the management of the project portfolio at Las Bambas, and recently, we were awarded the PMO service at Quellaveco.

Have you observed any trends in the demand for your engineering services?
The demand for engineering services in mining is closely related to the technical challenges faced by mining companies. There has been a growing emphasis on technology and sustainability, which now accompany project development. A clear trend is the deepening of ore bodies, as open-pit mines transition to underground mining to continue operations for decades to come. Additionally, there are environmental challenges, such as those faced at Los Bronces, where companies are planning mining methods that avoid surface impacts by using underground mining techniques.

What initiatives has R&Q Ingeniería implemented to improve mining sustainability?
We have voluntarily developed a sustainability strategy aimed at minimizing our impact. Additionally, we are involved in consulting services focused on decarbonization, helping mining companies transition to lower carbon emissions. We are also forming partnerships with other firms to combine capabilities and provide more comprehensive services.

How can the mining sector involve more women in leadership and fieldwork roles, and attract young talent overall?
First, we must eliminate prejudices. Beyond that, it is essential to encourage more women to pursue science and technology degrees at the university level, with targeted outreach programs beginning in schools. Universities are making great efforts in this area, offering special programs and quotas for women in technical careers. Furthermore, companies must provide flexible working conditions, recognizing the greater family responsibilities that many women still shoulder.

Do you think Chile could soon have a fully digital mine, considering the advances seen in Peru and other regions?
When you observe the Integrated Operations Centers (IOCs) at mines like Codelco's and BHP's operations, where large portions of the mine are managed remotely, you see that Chile is already well on its way. Technologies like autonomous trucks and remote monitoring are already addressing the major technical challenges of digital mining. Therefore, it is entirely feasible that Chile will have fully digital mines soon.

What role does R&Q Ingeniería play in advancing digitalization and safety in mining operations?
Internally, we have established IOCs to monitor and support our field teams, ensuring quality through centralized expertise. In safety, we provide expert services, including audits and preventive advice. We actively support the transition toward centralized safety monitoring systems where AI detects risky behaviors, complementing human expertise.

In a competitive market like mining engineering in Chile, what differentiates R&Q Ingeniería from other firms?
One key differentiator is our focus on technology. We have developed a proprietary project management system called R&Q+, initially created for construction supervision and later expanded to manage entire projects. This system provides full traceability and centralized information, facilitating real-time monitoring and ensuring knowledge transfer across different projects. Our 48 years of experience, including 25 years dedicated to mining, and involvement in the most significant mining projects in Chile, give us a strong foundation that we are now also expanding into Peru and the region.

Looking ahead to 2025 and beyond, what are R&Q Ingeniería's strategic plans?
Our primary goal is to positively impact the mining environment by delivering better services that support successful project execution, minimize deviations, and help realize the extensive portfolios of projects identified in Chile and Peru. Strengthening our capabilities to handle larger volumes of work is critical, especially given the scale of upcoming projects. Internationally, we are strongly developing our presence in Peru and Colombia, and we are beginning operations in the United States, mainly targeting the infrastructure sector. Our long-term vision is to strengthen our position regionally while maintaining the high standards that have defined R&Q Ingeniería for nearly 50 years. ■

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panies to save on capital whilst they wait to deploy the large expansions and investments announced for the next several years. LEN Ingenería has, therefore, adapted its business model, focusing on different areas to help mining companies lower their operating costs. "In copper mining, where transportation costs can be as high as 30% of extraction costs, LEN has focused on designing more efficient infrastructure, particularly on industrial and public roads, which are critical for safe and well-planned logistic operation," revealed Julián Alvear Fernández, CEO.

Firms are looking for innovative ways to become partners with mining companies and are signing long-term contracts for future success. R&Q Ingeniería is focusing its efforts on technological innovation to do so, using its proprietary project management system, R&Q+, to be able to monitor an entire project lifecycle. Agustín Cabañas, the firm's mining manager, outlined: "R&Q+ allows the company to be involved from concept to execution, preventing challenges that could lead to project overruns and costly oversights. This system provides full traceability and centralized information, facilitating real-time monitoring and ensuring project knowledge transfer across different projects."

A major hurdle to the progress of projects and a particular challenge facing engineering firms is Chile's lengthy permitting process, which can delay projects before they even get started. Pares&Alvarez, an engineering company, said the last 12 months were its best on record. Their core services are PFS, FS, and environmental impact assessments, as well as permitting management, placing them at the heart of this pressing issue. "Permitting challenges are inherent to the modern world, where requirements are increasingly strict, especially from environmental and community perspectives. New requirements add layers of complexity beyond traditional regulations, meaning we must operate with greater care and explicit, verifiable compliance," explained CEO Víctor Contreras.

Dutch engineering company Arcadis has observed an acceleration of investment in Chile throughout 2023, moving towards project execution in the upcoming years. As a result, the company has shifted its focus from analysis and trade-offs to gearing up for increased construction. "Chile has always sought to have very high standards, with a clear example being the seismic standards that exist here. There are improvement opportunities that could allow us to make the system equally robust to protect communities and the environment while allowing rules and especially much faster times to develop projects," revealed Luis Soruco, general manager of Arcadis Chile.

To enhance internal efficiency, they developed Arcadis GPT, an AI platform designed to streamline internal processes and assist the company with time-consuming repetitive tasks.

Transitioning from being a part of Tetra Tech for over a decade, 2024 saw Metálica Consultores standing on their own and looking to relaunch in time for the incoming mining boom many experts are predicting. Severino Modena, general manager, Metálica Consultores, commented: "There is a general feeling that a massive amount will be invested over the next 10 years, and even the government is working on speeding up the permission process for projects. Investors know that each dollar they invest in Chile could only start giving returns in 10-15 years. Therefore, the risk is enormous. If Chile manages to improve this aspect, private investors will be attracted to the country."

As investment floods into Chile, now is as good a time as any for engineering companies to secure the partnerships that will last for decades to come. Companies will need to adapt to the market's needs, ensuring they are well-suited for the varied and complex projects in the pipeline for some of the world's largest mining companies. However, Chile's bureaucratic and often overbearing permitting process is hindering their progress, and with a new government incoming in 2026, all eyes will be on the reforms introduced as to how the state can help the value chain become more involved in Chile's largest industry. ■

William Lilis

Director of Operations, Minerals & Metals, South America

WOOD

How does Wood engage with junior mining companies and support their development?
Our business has been mostly focused on design, engineering and project execution. We realized, however, that if we can identify projects in the initial stages of exploration and development, there is work to do in estimating resources, mine planning and design, and conducting studies. These are the areas in which Wood offers the most value to juniors. We now have a dedicated team for digitization and another for decarbonization. These teams are working hard on solutions for the energy transition, incorporating sustainable mining into our operations and establishing autonomous and carbon-free projects. The Project Development Group (PDG) is then looking to bring this into mines at the earliest stage possible. Another way that Wood works with juniors is supporting them with NI43-101 and JORC reports to get on the stock market and raise capital.

What challenges does Chile's robust regulatory environment present?
The regulations in Chile are the most comprehensive in Latin America; however, this sometimes means it can take decades to bring a mine into development and then into production. That said, I believe our strong regulations demonstrate the robustness and maturity of the mining market in the country. ■

Manuel Viera Flores

President

METAPROJECT

Among Metaproject's main business areas, which is experiencing the most growth?
Without a doubt I would say services. Engineering alone does not generate significant revenue, even though it plays a critical role in setting industry standards and selecting the right technologies and equipment. In the past, companies would purchase equipment first and then adapt engineering plans around them. Engineering determines the specifications first, strengthening our role in the industry.

What are Metaproject's priorities for 2025? Are there any major projects on the horizon?
Our top priority is launching an EPC project in Turkey — the "Calta" nickel and cobalt project, valued at US$800 million. In addition, on August 14, we will inaugurate our office in Mexico City, marking the establishment of Metaproject Mexico. Mexico presents a massive market opportunity, and we plan to have a strong presence there. We are also expanding into San Juan, Argentina, through a partnership and have ongoing projects there. Furthermore, in Paraguay, we aim to help develop the country into a mining powerhouse, working with five mining companies on projects involving lithium, rare earth minerals, nickel, titanium, and magnetite. Our ultimate goal is to take Chilean engineering worldwide, as it continues to be recognized for its best practices. ■

Víctor Contreras

CEO

PARES & ALVAREZ

Which of your services have seen the most demand in Chile in recent years?
Our core services are pre-feasibility studies, feasibility studies, full engineering development, environmental impact assessments and declarations, strategy definition, and permit management. All these areas have seen robust growth.

What challenges has the company faced recently, and how have you addressed them?
One is sustainability, which we have now formalized with measurable goals and actions. Other ongoing challenges include maintaining high operational standards and supporting system stability. In terms of company-specific challenges, maintaining and attracting qualified personnel has been important. We have had success here, with low staff turnover, strong internal culture and a good working environment based on respect, ethics, and quality.

What are Pares&Alvarez's strategic plans for 2025 and beyond in Chile and Peru?
In Chile, we are engaged in important projects, such as an EPC project related to the Centinela port project. Internally, we are continuously improving our workforce through skills assessment, hiring strong professionals, and strengthening ties with universities. ■

Underground Momentum

Contractors look to cement their place in the mining boom

As copper prices remain at record highs, mining companies are looking to expand their projects, both horizontally and vertically, in order to capitalize on the economic gain offered by such a favorable market. For some companies, this means going further underground than ever before, but for others this entails a much more complicated process of transitioning from an open pit to an underground operation. This presents a unique opportunity for Chile's construction companies, all vying for multi-year, multi-million-dollar contracts to build underground and open pit infrastructure that will extend mine life and keep mines safe for workers entering these new areas.

Such an opportunity does bring challenges, but these can be overcome if construction companies are able to put to use the wide range of technologies and modern equipment available to them to make their projects more efficient, safer and more sustainable. "The mining construction sector in Chile is facing several key challenges. Chief among them is the need to improve efficiency and productivity by innovating processes and adopting new technologies, many of which originate from outside the mining sector," said Caroline Vender, CEO of Sigdo Koppers.

2024 was a year of consolidation for the company, in preparation for the boom in mining construction set to take place. Sigdo Koppers prioritized internal growth and strategic planning to prepare for the challenge ahead, and one of the keys to meeting this challenge will be the use of technology.

A major player in the underground construction sector of Chilean mining is STRABAG ZÜBLIN, which draws on its experience in Europe and other sectors, for example building the longest tunnel in the world in Gotthard, to be a one-stop-shop for mining companies. The company has been impressed since entering Chile of how technologically advanced mining operations are. Mario Theurl, managing director, commented: "Chile meets all the requirements to lead in technology and has all the basic conditions to seize the opportunities for adapting mining to the modern world. Many companies, such as Codelco, but also the private mining in Chile are open to adopt new technologies and can serve as an example for other players in the world-wide industry."

One of the key new pieces of equipment being deployed currently in mining construction is the Tunnel Boring Machine (TBM). Whilst the technology has existed for several years, the requirements of Chilean mines now warrant its widespread use, with construction companies reaping the benefits of safer and more efficient projects. "In the future,

Image by i love pixel at Pexels

I believe that mechanized tunnelling and TBMs, which have a lower carbon footprint than conventional tunnelling, will have an impact on the entire mining industry. Everyone in the industry will have to work together to bring these technologies into the mainstream, as their positive impact on the world mining sector cannot be underestimated," continued Theurl.

SKAVA Consulting is one company that has already used a TBM in the field in Chile, both at greenfield and brownfield underground developments. At Chuquicamata, a mine that transitioned from open pit to underground operations recently, SKAVA Consulting has worked on two projects using TBMs. Juan Pablo Merello, general manager revealed: "One project delved into building up the accesses to the mine, and now we are working together with Codelco in a pilot project concerning TBMs, advising them on the design of the machine for it to have a small radius of curvature to succeed in carving the galleries of the mine."

The future of the TBM is promising with major mining companies putting the fate of their projects in the hands of this technology. "Codelco expects this to be a feasible option for all mines. All surface mines, particularly in Peru but also in Chile, have plans to expand underground due to lowering grades," expanded Merello.

Another company working on a contract at Chuquicamata underground and implementing technologies to complete it is Master Drilling, which acquired Chilean innovation company Konec in 2024 in order to integrate advanced technology into its offerings. Master Drilling is introducing a Mobile Tunnel Borer (MTB) to its fleet. "The main challenge is the high initial investment and the learning curve associated with adopting new machinery. Productivity may initially be lower as workers adapt to the technology. However, the long-term benefits far outweigh these challenges. Our MTB enables continuous mining operations, unlike traditional methods that require stopping for blasting, ventilation and material removal," outlined Fernando Vivanco, Master Drilling's general manager.

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Eduardo Cossio Chirinos

CEO

INCIMMET

> If we stop treating each country as an isolated island and adopt a regional perspective, the value for all stakeholders multiplies.

What was INCIMMET's origin, and how has it evolved since then?
INCIMMET was founded in 1993 as a Peruvian-owned company specializing in mine backfill, and more specifically, hydraulic backfill. Over time, we fine-tuned our expertise in backfill and started exploring other methods, realizing how much this activity sped up mine production and why it made sense to bring in more services. As such, we ventured into underground construction and comprehensive mining solutions, including ore extraction, tunneling, vertical and horizontal excavations, roof support, and civil works.

What led you to secure the contract for the trade-off assessment at El Cachorro for Antofagasta Minerals?
We have been working outside Peru since 1995, but in 2024, our expertise in backfilling opened the door for us in Chile. Chile is a country with large-scale copper mining operations but backfill is something that is not widely used - not because it is not known, but rather because of the nature of the deposits. On the other hand, in Peru, backfilling is a core part of most mining operations.

When Antofagasta Minerals needed a backfilling solution for an underground project, they saw us as a viable option.

What is your approach to positioning INCIMMET as an attractive option for Codelco in a highly competitive market?
Codelco is a state-owned company, so it operates under its own dynamics; thus, our approach needed to be different. We seek partnerships and alliances with companies that understand how to work within such an organization. The key is to be complementary, not direct competition. An example of what was stated earlier is the formal partnership we established with SCHWAGER in March 2025, to participate in the tender processes for Codelco in a joint manner.

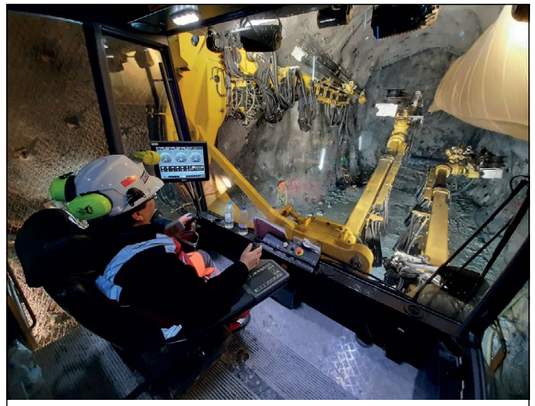
As contractors, what trends have you observed in the Chilean market?
Mid-sized mining operations in Chile rarely outsource underground excavation as we see producers do in Peru. In Chile, producers usually bring in contractors only when they have to expand operations and lack internal resources. Peru and Chile share a challenge: the availability of skilled labor. In fact, it is a regional problem that demands a collaborative approach because mining must appeal to younger generations, especially in Chile, where labor shortages could push the industry to look for workers in neighboring countries. What solves a problem for one may create challenges for another, so that is why we believe in 'making the path together.'

What lessons can Chile learn from Peru and vice versa?
Peruvian know-how can add significant value to mid-sized producers in Chile, especially in the comprehensive management of deposits with production of up to 30,000 t/d. Our ability to develop between 2,000 and 2,500 m of tunnels per month in a single mine is a key differentiator that adds significant value in Chile. We also have a team of 2,000 workers, many of whom we trained and are ready to mobilize, helping clients reduce labor strain and speed up operations.

Chile, on the other hand, has a more structured project management approach, prioritizing methodology and long-term success, whereas Peru remains more operationally focused. Chile is also more open to innovation and technology, while Peru tends to take a wait-and-see approach. At INCIMMET, for example, we seek to test new technologies like FreeRocks and EXC Blast, but obtaining prior validation is challenging without companies first supporting trials, becoming a vicious cycle that slows down the adoption of new technologies. This is where my previous point also becomes relevant: if we stop treating each country as an isolated island and adopt a regional perspective, the value for all stakeholders multiplies.

What challenges do you see in Chile as a new market for INCIMMET?
From Chile, we expect greater business visibility regarding our pipeline. We have had a good start and are participating in various tenders both independently and in partnership, as we did with SCHWAGER for Codelco.

The horizon is full of opportunities. Chilean mid-sized mining has not been working with a contractor offering horizontal and vertical excavation as a single service. In fact, in Chile, horizontal contractors typically subcontract vertical contractors, driving up operational costs. At INCIMMET, we can provide a comprehensive solution, including mine backfill, that optimizes costs and efficiency. ■



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Construction company Besalco is working in consortium with Master Drilling. “In the case of Master Drilling, its advanced machinery and expertise in drilling complemented our civil works capabilities. This type of partnership allows us to tackle larger or more technically challenging projects,” detailed Paulo Bezanilla Saavedra, general manager of Besalco.

Like their collaborators and other construction companies, Besalco is looking to implement technologies across its wide range of services, although this has not been possible yet. “In construction, we face limitations in automation due to the unique and non-repetitive nature of the tasks. However, in machinery operations, we have implemented remote-controlled equipment, particularly in hazardous environments,” Bezanilla Saavedra elaborated.

With expansions and billon-dollar projects heading towards execution in 2025, such hurdles will need to be overcome and technology will be crucial in doing so. “The implementation of technologies, particularly in fleet control and remote operations, ensures that we stay ahead of industry standards in terms of equipment reliability and safety, which is critical in large-scale mining operations,” said Guillermo García Cano, executive director of Besalco.

Outside of TBMs, other branches of construction are also adopting new technologies to help with the complex array of projects currently in the pipeline. Flesan is a national leader in dismantling and demolition and recently developed the Flesan Minería division to bring more of a focus to the company’s mining services. Michel Chait, general manager, noted: “Currently, Flesan Minería is advancing four major innovation projects, selected from an initial portfolio of 19, based on their impact and scalability. The company is also actively pursuing large-scale funding through CORFO, reflecting its commitment to innovation and industry-leading safety standards.”

Through CORFO, the Chilean government is encouraging participation in technology and innovation across the mining industry, which is a positive sign for construction companies already incorporating it.

TECHINT E&C is currently involved in an interconnection project between Quebrada Blanca and Collahuasi, and has established two new corporate directives focused on digital transformation to enhance efficiency as the industry heads towards a future with more complex construction needs. “Our primary vision is to become more productive and capable of handling multiple large projects simultaneously. By leveraging technology, we aim to provide mining companies with more flexible and efficient project execution capabilities,” explained Claudio Perillo, TECHINT E&C’s CEO.

As well as using technology to improve efficiency, companies are looking to harness the capabilities of innovation to improve other areas of the construction business, such as safety. Echeverría Izquierdo Montajes Industriales (EIMISA), is incorporating orbital welders and automated welders into its current projects to keep as many workers out of harm’s way as possible. Darío Barros, the company’s CEO, discussed: “In terms of safety, we have moved from reactive to predictive safety, using digital tools to identify risk early. A clear example was the early detection of low compliance patterns in the field, which allowed us to implement corrective actions before incidents occurred.”

Mining is an evolving industry, with its construction sector on the precipice of a new era thanks to equipment and technology breakthroughs. To reflect such changes in the sector, companies are rebranding to bring technology to the core of the business. Included is this trend is Syncore, which started life as Promet Montajes before a rebrand in 2024. “We sought to modernize our brand and align it more closely with innovation, a central pillar of our identity. Our core value, ‘We Challenge Ourselves,’ embodies our commitment to disruptive thinking and continuous improvement,” emphasized Gastón Rubio, CEO, Syncore.

The company has won awards from APRIMIN, Codelco, Albemarle and Anglo American, citing their use of Building Information Modelling Technology as a key differentiator in the market.

Placing technology at the heart of their company is also familiar to the STRACON Group, which operates the STRACON Technologies branch focused on operational technologies, digital tools and communications. STRACON expanded into Chile in 2022 through the acquisition of Ameco and has been growing market share in mine construction and expansion ever since. “Our added value lies in the integration of services and the incorporation of technological innovation through STRACON Tech. Early involvement is key. We participate in the planning phase to optimize fleet design, improve project timelines, and reduce overall costs,” explained Mario Maureira, business development manager, STRACON.

Steve Dixon, the STRACON Group’s CEO, added: “Our structure enables us to deliver engineering, construction, operations, and technology solutions under a single umbrella. This integrated approach gives us the flexibility to tailor solutions to each project while ensuring consistency and efficiency throughout all stages. It also facilitates knowledge sharing across teams and regions, giving our clients access to the full breadth of our expertise.”

On top of new technologies and equipment, construction companies are bringing new solutions into the Chilean market from abroad in order to secure contracts from the nation’s largest mining players. INCIMMET, a Peruvian-owned company specializing in mine backfill solutions, entered the Chilean market in 2024, as backfill is only just beginning to become popular due to the nature of deposits. “You have to remember that each country adapts its mining methods to its own geology and production needs and that there is no single backfilling formula: you must understand the terrain, production, and available resources. It also takes constant innovation, quality assurance methodology, and testing of new materials to improve the whole process,” highlighted Eduardo Cossio Chirinos, INCIMMET’s CEO.

Technology and groundbreaking equipment are changing what is possible in mine construction. These developments are much needed, as the current landscape is demanding more innovative solutions than ever before. Mines are going deeper underground, this much is unavoidable, but what can be avoided are unnecessary risks and unforeseen problems, all of which technology can help predict and thus prevent. ■

Juan Pablo Merello
General Manager
SKAVA CONSULTING

> “This year, our key objective is to launch the independent operations of our geology and hydrogeology divisions, paving the way for their autonomous growth.”

Mario Theurl

Managing Director

STRABAG ZÜBLIN

> Chile meets all the requirements to lead in technology and has all the basic conditions to seize the opportunities for adapting mining to the modern world.

What is the latest from STRABAG ZÜBLIN, particularly in the Chilean mining sector?
STRABAG ZÜBLIN has experienced significant growth in recent years. We have become one of the major players in underground mine construction in Chile. Our experience in road building, civil engineering, plant construction and mechanized tunnelling, in addition to design, allows us to offer a one-stop shop for our mining, infrastructure and civil works clients.

How do STRABAG and ZÜBLIN adapt their mining solutions to the unique geology of Chile?
We have relevant experience in dealing with rock bursts in the Alps through the construction of the Gotthard Base Tunnel, the longest tunnel in the world, and this translates well to Chile because the Andes have experience in rock bursts unlike anywhere else in the world. In the future, I believe that mechanized tunneling and TBMs, which have a lower carbon footprint than conventional tunneling, will have an impact on the entire mining industry. Everyone in the industry will have to work together to bring these technologies into the mainstream, as their positive impact on the world mining sector cannot be underestimated.

Do you see much collaboration in the mining industry?
Mining companies operate in a highly competitive environment due to the nature of the contracting business. However, this does not exclude the possibility of fostering collaboration within the industry. Productivity is an area where the entire industry can improve to attract more investment to Chile, and this is what we have been focusing in recent years.

What is the effect on ZÜBLIN of there being more focus on brownfield projects?
Underground mines have the potential to have a lower environmental impact. The transformation from open pit to underground has the advantage of minimizing the surface environmental footprint and, when combined with brownfield projects, the environmental impact is further improved as the infrastructure and facilities are already in place.

This is fully in line with our strategy and supports our environmental goals. We have been working at the El Teniente underground project for almost 30 years and it is the largest underground mine in Chile. We have four contracts there, involving around 3,000 workers, which is a logistical challenge for STRABAG and ZÜBLIN, as are the different types of rock in the mine.

From a construction point of view, it does not matter whether we are working on a greenfield or a brownfield site. We can provide the full range of construction services to the mining sector, as well as roads, earthworks and civil engineering. Our civil works team is currently working on wind farms and dams to supply the mines in the north with green energy.

What is STRABAG and ZÜBLIN'S progress on its ESG and environmental targets?
Our strategy revolves around 'People, Planet, Progress'. At Züblin, we aim to be green in our operations by 2040 and we are actively pushing to achieve these goals.

In our mining division, we are looking at electrified mining equipment with our suppliers, with several solutions in operation at El Teniente, including electric mixers and 4x4 electric trucks, putting us at the forefront to continue to develop in this area.

However, we are not there yet, and it will take a lot of work from both us and our suppliers, but it is an area we are working hard on. All stakeholders in the mining industry should aim for the same goal. Collaboration is key.

Do you think Chile is a leader in terms of technology and sustainability in mining?
Chile meets all the requirements to lead in technology and has all the basic conditions to seize the opportunities for adapting mining to the modern world. Many companies, such as Codelco, but also the private mining in Chile is open to adopt new technologies and can serve as an example for other players in the world wide industry.

What are your plans for STRABAG and ZÜBLIN in Chile in 2025?
We have a bright future ahead in the country for sure. Our core business here is underground mining, but we are also expanding into the rest of Latin America. We have just opened a branch in Lima and are looking to develop a more holistic business to offer our clients a one-stop shop, creating value for ourselves, the customers, and the country in which we operate. ■

DM

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Steve Dixon and Mario Maureira

SD: Group CEO

MM: Business Development Manager

STRACON

Could you introduce STRACON Group and explain how the last two years have been for the company?
SD: STRACON Group is a diversified mining services provider with operations throughout the Americas. Our business spans the entire mine lifecycle, from early-stage engineering and development to construction, operation, and ultimately mine closure. We provide services for both surface and underground mining. Our strength lies in delivering integrated, scalable solutions across jurisdictions.

STRACON Group is composed of several specialized companies. STRACON leads our open-pit mining operations and construction projects. Dumas, based in Canada, provides underground mining services and operates in both North America and Mexico. STRACON Engineering focuses on infrastructure engineering, with expertise in water, tailings and energy management. AMECO is our equipment rental and asset management division, operating primarily in Chile. STRACON Technologies delivers operational technology, digital tools, and communications infrastructure.

MM: STRACON Group began establishing its presence in Chile in 2022 and 2023 through the acquisition of AMECO. This enabled us to gain local knowledge, build relationships, and earn the trust of key clients. With this foundation in place, we secured a major greenfield project at Fenix Gold — our first project in Chile. It also presented our first challenge: delivering a comprehensive construction contract for a new open-pit mining operation, including the development of leaching pads, ponds, mining roads, and all related earthworks.

What differentiates STRACON in the Chilean mining construction sector?
MM: Our added value lies in the integration of services and the incorporation of technological innovation through STRACON Tech. Early involvement is key. We participate in the planning phase to optimize fleet design, improve project timelines, and reduce overall costs. Our financial strength is also a key differentiator, allowing us to invest in new projects and ensure access to high-performance, fit-for-purpose equipment.

How does STRACON Group provide value to clients across the mining project lifecycle?
SD: Clients are increasingly seeking comprehensive, integrated services that streamline project management and execution. Our model allows for early involvement in project development. We partner with clients during the study and planning phases and continue through execution of construction and operations. Our service continuity improves coordination, reduces complexity, and enhances outcomes.

How do you compare the Chilean market with others in the region, and what are your plans for expansion?
SD: Entering the market required adapting to its specific cultural and labor dynamics. Permitting processes in Chile can be lengthy and complex, but we are accustomed to navigating similar regulatory environments in other regions. What matters is developing local partnerships, understanding the market, and building a long-term presence, which is what we have done through AMECO.

MM: Chile is a mature mining market, but it faces specific challenges, including labor shortages and a lengthy permitting process. Workforce availability is becoming an increasingly important issue. At STRACON Group, we are investing in the training of new personnel and remain open to combining local talent with experienced international workers to maintain high standards of productivity and safety. We are confident in Chile's ability to overcome these challenges and continue advancing its mining sector.

What are STRACON's future priorities and strategic directions, especially in Chile?
SD: Chile is one of our priority markets. In 2025, it will represent approximately 25% of STRACON Group's activity, and we expect this share to grow to 30% in the coming years. Our goal is to strengthen our presence by offering the full range of services across the Group. This includes expanding into underground mining through Dumas and increasing the delivery of engineering solutions for water, tailings, and renewable energy infrastructure. We are also advancing our technology offering, particularly for legacy operations looking to modernize through improved communications and automation.
MM: Chile is positioned to play a key role in the global mining industry, particularly in advancing environmental goals through increased copper production. We believe the underground mining trend presents a significant opportunity. Our underground services company, Dumas, is actively working to enter this segment in Chile. Our goal is to complement the Group's existing capabilities and establish a strong presence in this area. ■

> If the government can address security and permitting efficiently, it will help unlock the potential of numerous mining projects and solidify Chile's position as a global leader in the mining industry.

Guillermo García Cano

General Manager

BESALCO

Could you summarize the main achievements from last year, and explain Besalco's work in the mining industry?
Besalco operates across multiple sectors within the mining industry through its various companies. Besalco Construcciones handles civil works such as infrastructure for mines, while Besalco Montajes specializes in industrial plant assembly, including stackers, conveyor belts, crushers, and engineering works related to mining production processes. In addition to our construction expertise, we offer a comprehensive machinery service.

Last year, we completed significant mining projects, such as the desalination plant for the QB2 project. Many of our mining service projects are long-term, spanning several years, and are substantial in scale and value.

How do you view the growing trend of collaboration between companies in the mining sector?
Our partnerships are typically driven by either the scale of the project or the need for specialized expertise. In the case of Master Drilling, their advanced machinery and expertise in drilling complemented our civil works capabilities. This type of partnership allows us to tackle larger or more technically challenging projects. We are always open to exploring collaborations with strategic partners, particularly in regions like Peru, where we see substantial growth potential.

What are the main differences between the Peruvian market and the Chilean market?
We've built a strong track record in Chile, where we've had the opportunity to work with nearly all of the major mining companies. In Peru, we're in the exciting phase of expanding our presence, having already completed several meaningful projects. Each market brings its own strengths and characteristics—Peru's mining operations, for example, often utilize more compact equipment.

How is Besalco leveraging new technologies?
In construction, we face limitations in automation due to the unique and non-repetitive nature of the tasks. However, in machinery operations, we have implemented remote-controlled equipment, particularly in hazardous environments. Additionally, we have incorporated an advanced fleet control system that monitors the performance of our machinery in real-time. This system tracks everything from the location of the equipment to the temperature of the hydraulic oil, allowing us to prevent potential failures before they occur.
The implementation of technologies, particularly in fleet control and remote operations, ensures that we stay ahead of industry standards.

How do you balance safety with the need for efficiency considering the growing global demand for copper and lithium?
We firmly believe that safety measures, if properly managed, do not conflict with productivity. The main issue lies in the permitting process, which is often slow and inefficient. For larger projects, mining companies typically handle permitting, so it does not directly affect us. However, the delays in obtaining permits for smaller-scale projects can hinder our ability to meet project timelines. There is a law under consideration to improve the permitting process, but the real challenge lies in incentivizing individuals involved.

What should be the focus of the incoming government?
The government must focus on streamlining the permitting process, which is currently a major barrier to development. Chile has the potential to maintain its global leadership in mining, but only if new projects move forward without unnecessary delays. The effective handling of permitting and ensuring security are key areas that need immediate attention.

If the government can address security and permitting efficiently, it will help unlock the potential of numerous mining projects and solidify Chile's position as a global leader in the mining industry.

What are Besalco's future plans and projects?
Besalco is positioning itself to take advantage of significant opportunities with upcoming investments, however, many of these have yet to materialize due to delays. Our strategy is to grow steadily without rushing into growth, which ensures long-term stability. Our financial strength and high safety standards make us an attractive partner for mining companies.

Our expansion into Peru is part of a long-term strategy to replicate our success in Chile. We are confident that our capabilities in construction, assembly, and machinery will be well received in the Peruvian market, where we see significant growth opportunities.

Can you discuss Besalco's approach to sustainability and environmental responsibility?
In addition to environmental initiatives, we have generated revenue by selling carbon credits from our renewable energy projects, including a hydroelectric plant. ■

> Chile's mining landscape is evolving, with many of its century-old mines transitioning to underground operations. This shift aligns with Master Drilling's long-term strategy to expand its market presence.

Fernando Vivanco

General Manager Chile

MASTER DRILLING

Could you provide an overview of Master Drilling's work in Chile during 2024?
2024 was a strong year for both the group and our operations in Chile. One significant project was our contract at Chuquicamata Underground, where we work in consortium with Besalco. We completed the first contract and have since been awarded a second. Additionally, we expanded our business by acquiring a majority stake in Konec, a Chilean technology company specializing in innovative solutions. This acquisition is part of our strategy to integrate advanced technology into our operations. We are also advancing in mechanical cutting technology, particularly with the Mobile Tunnel Borer (MTB) machine designed and manufactured to operate in underground mining.

How has Master Drilling's approach to projects in Chile evolved?
We implemented a major shift in mechanization around 20–25 years ago, making vertical developments fully mechanized and remote-controlled. We now see a similar transition happening in horizontal mining developments. Our focus is on improving efficiency, safety, and sustainability. The recent acquisition of Konec aligns with this vision, as the company specializes in collision avoidance and anti-runover systems using AI.

How does Chile compare to other countries in the mining sector, and what steps should it take to maintain its leadership in copper and lithium production?
While Chile remains the top copper producer, its global share has declined from 35% historically to around 25%. To maintain its leadership, Chile must focus on streamlining its permitting process, as excessive delays discourage investment. Regulatory certainty is also crucial, as inconsistent government decisions create uncertainty for investors. Additionally, embracing technological advancements is essential for increasing efficiency and sustainability in the sector. Workforce training should be a priority, as there is a growing need for skilled labor, particularly in technical fields. Finally, Chile must ensure its tax policies remain competitive, as other mining nations like Canada and Peru are lowering taxes to attract investment.

How does Master Drilling adapt its solutions to the net-zero challenges of Chilean mining companies?
The company actively monitors key environmental indicators such as water and oil usage, as well as its carbon footprint, in both Chile and other countries where it operates. It also prioritizes social responsibility, promoting greater inclusion of women in the workforce and adhering to strong governance practices. Master Drilling understands that sustainability is not optional but essential for long-term success, particularly in mining, where projects are long-term, and strong client relationships are built on trust.

Can you explain the challenges and benefits of introducing new technologies like the MTB machine?
The main challenge is the high initial investment and the learning curve associated with adopting new machinery. Productivity may initially be lower as workers adapt to the technology. However, the long-term benefits far outweigh these challenges. Our MTBs enable continuous mining operations, unlike traditional methods that require stopping for blasting, ventilation, and material removal. This results in increased efficiency, higher safety standards, and reduced overall costs over time. Additionally, our MTBs can be adapted to different rock conditions, making them a versatile solution for modern mining needs.

What are Master Drilling's plans and objectives for 2025 and beyond, both globally and in Chile?
Since 2016, the company has significantly increased its sales, and by 2028, it aims to double its current revenues. Achieving this goal is not merely about increasing sales but also about diversifying services and solutions in the mining sector. A key focus is bringing cutting-edge solutions, such as the first MTB, to Chile's mining industry. The success of such initiatives could open new market opportunities and solidify the company's leadership in advanced mining solutions. Master Drilling expects 2025 to be a better year than 2024, driven by new projects, expanded markets, and the introduction of innovative products and services.

Chile's mining landscape is evolving, with many of its century-old mines transitioning to underground operations. This shift aligns with Master Drilling's long-term strategy to expand its market presence. The industry's move toward underground mining is driven by sustainability concerns, as these projects have a lower environmental impact despite their higher initial costs. The company has closely followed projects like Chuquicamata Underground and is monitoring future underground expansions at mines such as Los Bronces and Escondida. Additionally, new greenfield projects are increasingly being designed as underground mines, reinforcing the demand for specialized drilling solutions.■

Caroline Vender

CEO

SIGDO KOPPERS INGENIERIA & CONSTRUCCIÓN (SKIC)

What are the main challenges and opportunities facing the mining construction industry in Chile?
Chief among them is the need to improve efficiency and productivity by innovating processes and adopting new technologies, many of which originate from outside the mining sector. At the same time, there is an urgent need to accelerate the transition toward greener practices to achieve to sustainable mining goals. A major mining investment cycle is on the horizon, and we must prepare for it now.

How is Sigdo Koppers promoting greater female participation in Chile's mining industry?
Over the past few years, we have trained more than 4,000 women, equipping them with the skills necessary to grow professionally in the industry. This effort presents a unique opportunity to transform the composition of the mining workforce.

How can companies attract and retain talent in the mining industry?
While demand for talent in engineering and construction remains high, this is a cyclical industry. Companies must be prepared for both talent shortages and labor surpluses. It is not enough to offer high salaries in the short term, we must foster a sustainable, long-term talent strategy.

Where is collaborative mining headed?
A particularly effective model of collaboration is approaching mining projects as ecosystems from the earliest stages. This means involving engineering firms, suppliers, contractors, and other key stakeholders from the beginning to create shared value and ensure successful execution.

What are Sigdo Koppers' priorities for the future?
We are committed to delivering value to our clients through innovative, high-performance projects, while ensuring the safety of our people, caring for the communities where we operate, and making the investments necessary to build a stronger, more sustainable future. ■

Claudio Perillo

President Andean Region

TECHINT E&C

Can you provide an overview of TECHINT E&C's activities in the mining sector in Chile?
TECHINT E&C is currently working on two desalinated water projects: C20+ Water Transportation System for Collahuasi, and SADDN project (Desalination Water System for the North District of Codelco), which includes the Marine Works, the Desalination Plant, Pump Stations, 48"x 164 km Pipeline, and the Final Reservoir. We have also been involved in an interconnection project between Quebrada Blanca and Collahuasi, which is also approaching its final stages. Water-related initiatives are not only environmental considerations; they are essential for operational sustainability. With climate change affecting natural water patterns, desalinated water is crucial for reliable mining production, in other words, stable water supplies are essential for consistent mining operations.

What technological innovations has TECHINT E&C introduced recently?
We are experimenting with various technological innovations, like the use of the Pipetrack, which is a pipeline data management system that allows us to track, manage and report real-time data throughout the entire pipeline construction process. We are also using automatic welding system, 3D printing for concrete elements, drone transportation for loads up to 500 kg, and 100% electrical 4x4 vehicles among others. While regulatory challenges exist, particularly for drone operations, we see these technologies as crucial for increasing productivity, reducing our carbon footprint, and offering more options to our clients.

Our primary vision is to become more productive and capable of handling multiple large projects simultaneously.

How do you view Chile's position in the global mining landscape?
The country has demonstrated an ability to find viable solutions to challenges like water scarcity. Chile's mining sector continues to evolve. The potential infrastructure integration with Argentine mining districts could further enhance the region's mining capabilities. Our perspective is optimistic. Chile has established itself as a leader in mining, with a robust ecosystem of expertise, infrastructure, and innovative approaches to addressing industry challenges. ■

Gastón Rubio

CEO

SYNCORE

What opportunities and challenges do you see in the Chilean mining sector?
Chile's mining sector remains world-class, known for its high standards in safety, efficiency, and community engagement. The transformation over the past 30 years has been remarkable. However, significant opportunities remain—particularly in the areas of innovation and sustainability, with a strong need to enhance mining process efficiency.

We anticipate a new wave of investment, similar to what we saw in 2010, which will increase the demand for skilled labor, infrastructure, and technological innovation. Companies that can differentiate themselves and generate value—both in processes and in materials—will lead the next phase of growth.

What are Syncore's growth and expansion plans for 2025 and beyond?
We have a clear growth strategy through 2030, with a target of reaching US$350 million in annual revenue. We plan to achieve this through a combination of organic growth, strategic acquisitions, and expansion into related business areas. Our robust capital reserves position us well for this evolution.

We also represent several innovative international companies in Chile and we collaborate with European startups in robotics and automation. ■

Darío Barros

CEO

ECHEVERRÍA IZQUIERDO MONTAJES INDUSTRIALES (EIMISA)

Can you update us on Echeverría Izquierdo Montajes Industriales' recent activities?
Over the past four years, Echeverría Izquierdo Montajes Industriales (EIMISA) has established itself as one of the top three industrial assembly companies in Chile, strengthening its position through strategic contracts. In Chile, we maintain a long-term strategic relationship with Codelco, highlighted by our participation in flagship projects such as Rajo Inca. Additionally, we have maintained a continuous presence at El Teniente for more than 14 years and resumed work at Radomiro Tomic, Collahuasi, and Centinela Port.

Aligned with our diversification strategy, we have expanded our service offering to include earthworks through a strategic alliance with Excon.

Could you comment on trends regarding collaboration and partnership between mining service companies?
Mining companies want fewer dispersed contracts, opting to award larger and more strategic contracts, driving service company partnerships. In turn, engineering firms are incorporating construction companies early in the planning stages. At EIMISA, we actively collaborate with leading companies such as Bechtel, Worley, and Ausenco. ■

Michel Chait

General Manager

FLESAN

How important is the mining sector to Flesan, and which services are most in demand?
The company's primary focus within the mining sector is dismantling, a critical component of modern mine closure plans. Flesan's expertise in large-scale deconstruction has become indispensable to its clients' long-term strategies.

How does Flesan integrate technology and innovation to enhance safety in mining operations?
Flesan operates unique long-reach excavators, some extending up to 30 m, equipped with tilting cabs and custom-designed counterweights for complex dismantling tasks. These machines allow operators to maintain a safe distance of 10 to 15 meters from the demolition front, significantly improving both safety and operational efficiency.

Currently, Flesan Minería is advancing four major innovation projects, selected from an initial portfolio of 19, based on their impact and scalability.

How important is collaboration with other companies in executing large-scale projects?
Collaboration plays a central role in Flesan's strategy, particularly in large-scale dismantling projects. The company has created a specialized engineering division for dismantling, which has partnered with global leaders such as Fluor and Bechtel. ■

Every Drop Counts

Managing water risk from mine design to closure

Around 70% of Chile's copper production comes from the Atacama Desert and other northern, arid regions of the country, which are some of the driest places on Earth, with little to no freshwater available. Because of this, water is a critical constraint on operations and is a preoccupation of majors and juniors alike, particularly as copper mining requires between 70 and 150 liters of water per kg of copper produced. "Water scarcity is a major concern, seen through the growing investment in desalination plants. There is also increasing awareness regarding the environmental impact of tailings, even those located in desert regions. The industry recognizes that tailings can be a potential source of water for recovery and reuse, prompting a shift towards more sustainable tailings management practices," said Fernando Tobar, director, equipment and services of ANDRITZ, an international technology group, offering plants, equipment, systems and services to mining.

The necessity for water solutions is reflected in the multi-year contracts being signed between environmental consultants and water management companies, as well as Chile's largest mining companies. One example of this is Amphos21, which has signed contracts for several years at Escondida and Caserones, as well as with Codelco and Enami in their lithium projects. "We are advisors in mining hydrogeology, primarily in groundwater management, characterization, and prevention of water and soil contamination. We are dealing with the entire cycle of water in mining, from groundwater to surface water, and we help mining companies to follow a circular economy in water management, helping them with the reuse and regeneration of water," commented Juan Castaño, CEO of Amphos21 Chile.

The company has increased its turnover by 40% over the last year and is now looking to expand into soil decontamination, soil dewatering, and the application of AI in mining to capitalize on the increased focus from mining companies on water issues.

As more and more mining companies are focusing on environmental liabilities and water management from an earlier stage, this has entailed a greater involvement for those in the value chain that offer such services. Castaño expanded: "Each mining company must implement characterization studies of the mining sites, develop a closure plan, and conduct an operational impact assessment. The more precise the assessment is and the lower the potential impact, the lower the closure funds will be. The immediate consequence of that regulation is that mining companies have worked hard to improve their plans for closure."

Stantec Chile focuses on providing wall building, water management, and everything related to tailings management for the mining industry in Chile. The company is looking to expand further into different water management services, and recently started providing mine closure services in Chile. "Mine closure will remain a hot topic given the old age of many Chilean mines. We integrate closure considerations at every stage of mine development, design, and operation," noted Rosario Urrutia, country manager of Chile, Stantec.

As a solution to the challenge of freshwater availability and to lessen their environmental and social impact, companies are increasingly turning towards desalination. In 2021, 25% of the water used in mining in Chile came from the sea, either through desalination or direct seawater use. This is expected to rise to over 50% by 2030, according to Cochilco, with companies investing upwards of US$1 billion in desalination plants and technologies.

Opportunities abound for specialists that can offer solutions. Jerome Poujaud, Chile development director at Veolia, explained: "We also provide chemicals, membranes, consumables, and a wide range of digital solutions that allow our customers to improve the efficiency of their assets. Veolia's great asset is operating worldwide many models of plants from many manufacturers of different natures, such as potabilization, industrial treatment, or acid water treatment plants."

Due to the pressing issue of water management in Chilean mining, ANDRITZ is focusing on involving itself in all stages of the design and engineering of tailings plants. As well as a large presence in key copper projects, the company also has a 1 km2 facility near Albemarle's operations and the largest base of any company in the sector at SQM's project. Andrés Rojas, director, automation and digitalization, highlighted: "We integrate automation and digitalization right from the plant design phase. This involves collaborating with engineering firms and project management teams to develop accurate estimates of the equipment needed for water extraction, reinsertion, and tailings management. Tailings deposits are becoming increasingly critical, and our early involvement helps in designing and verifying configurations that address these challenges."

Chile has over 700 tailings deposits, with many classified as inactive or abandoned, which pose major environmental and safety risks. Because of this, companies are increasingly turning towards dry tailings solutions and stacking methods to improve the storability of their tailings.

WSP is the designer of Anglo American's High Density Stacking project at El Soldado. This method avoids the need to filter tailings with external filters, optimizing water use and eliminating the need for a containment wall. "Our work in mine water management complements our work in tailings deposit design, incorporating technology and digitalization that allows clients to make near real-time decisions rather than waiting for laboratory results that could take months," discussed Carolina Páez, mining manager of WSP in Chile.

Her colleague, general manager Juan Ignacio Ríos, added: "We are now moving into the next stage of high-density stacking, working to expand the application of this technology. 2024 marked a pivotal year, as technology began to be openly shared, and being part of its origin is a source of great pride for us."

Fugro is a leading specialist in geodata and recognized as a specialist in tailings management. "Chilean mining companies are actively aligning their practices with the Global Standard, striving for zero harm to people and the environment. Fugro is a key partner in this critical undertaking, providing comprehensive mapping, modeling, and monitoring of tailings dams. This includes detailed geotechnical investigations of both embankments and tailings basins, as well as seismic risk assessments and advanced field data analyses," said Oscar Vera, general manager, Fugro Chile.

The company has since been hired to conduct the entire geotechnical investigation for the project, demonstrating how water management and tailings solutions companies are becoming indispensable partners of the mining industry.

With 21 years of experience in the Chilean market and a strong focus on tailings treatment, Ingenalse works with Codelco and Amerigo Resources at the Minera Valle Central (MVC) tailings reprocessing unit. Reprocessing tailings presents a significant business opportunity to Chile's mining companies, allowing for greater profit to be extracted from operations and making them more environmentally stable. "Beyond MVC, companies such as BHP and Andina are also exploring tailings reprocessing. However, one of the primary challenges in this domain is the availability of water. MVC, for instance, relies on tailings from El Teniente, and any significant variation in solids content could severely impact their operations. This underscores the need for innovation in water recovery technologies, an area in which we are actively engaged," noted Juan Andrés Campos, general manager, Ingenalse.

As Chilean mining expands in some of the world's driest regions, water and tailings management have become critical to operational success and environmental responsibility. Companies are increasingly investing in desalination, digital tools, and innovative tailings solutions such as dry and high-density stacking to reduce water use and mitigate risk. At the same time, stricter regulations and rising public scrutiny are pushing water management and mine closure planning earlier into project lifecycles. This shift reflects a broader industry recognition that water is not just a resource, but a strategic asset essential to sustainability. ■

Image courtesy of WSP

Rosario Urrutia

Country Manager, Chile
STANTEC

> Three years ago, we started providing mine closure services in Chile, and we have secured several interesting projects in this area. This will remain a hot topic given the old age of many Chilean mines.

Could you give us a summary of your recent performance in the Chilean mining sector?
Two years ago, we had under 200 workers, and today we have surpassed the 300-employee landmark. We have grown a lot in a little time. Stantec focuses on providing solutions for a sustainable industry through creativity and technology. We are focused on large mining operations, with our most demanded service being tailings deposits: wall building, water management, and everything related to tailings management. But we also work in permit management and the environment, conducting environmental impact assessments, either for greenfield or brownfield projects, and we do so in a holistic way, covering the whole mine's life cycle. Likewise, with permits, we manage permit granting for all needs the mine may have.

Can you elaborate on the tailings, waste disposal, mine closure, and water management services you provide, and which is the most in demand?
We design mine tailings storage facilities with a strong emphasis on long-term safety and sustainability. Also, three years ago, we started providing mine closure services in Chile, and we have secured several interesting projects in this area. This will remain a hot topic given the old age of many Chilean mines. Our comprehensive expertise in environmental, regulatory, economic, and social aspects of closure significantly shapes our approach. We integrate closure considerations at every stage of mine development, design and operation. By adopting a holistic, multidisciplinary and integrated approach to site characterization and design, we develop solutions that effectively address the diverse challenges of mine closure.

How is Stantec's experience with partnerships?
Developing partnerships with clients is mutually beneficial, but it has to be based on trust, which takes time to develop. Nowadays, we can sit with our clients and share our experience and the solutions we have devised in other projects, whereas in the past, the relationship was more vertical.

How are Chilean mining companies advancing towards Net Zero targets and electrification?
Chilean companies are at the forefront in this field. For a long time, they have strived to look at alternative transport solutions or electrification.

Which measures are you implementing to attract young talent?
Keeping employees happy is challenging. In mining, most problems can be solved through technology, but when it comes to keeping your workforce happy, the concept of emotional salary showcases all its relevance. At Stantec, we are all approachable and supportive, and this makes the difference. We also boast remote working policies, which allow for flexibility and career building in parallel. The challenge is stronger when attracting younger talent, as they want to advance their careers fast, which in consulting may not be feasible, as experience is valued. Becoming a consultant is a post you earn through time. But these measures proved to be an asset in the long run, as our employees remain with us for a long time.

What can the government do to balance environmental responsibilities with mining and advancing new projects?
When I started, there were no such laws, and only foreign companies voluntarily adopted ESG standards. Nowadays, legislation is robust and comprehensive, with new rules being released every two months concerning specificities. This translates into additional efforts both for companies running projects and for us, the consultants. From fungi studies to luminosity, many things need to be considered. Deadlines are also problematic, hurting many projects, as several years must pass for all permits to be granted. However, all this depends on whether the project's planning is solid and well documented, in which case the processing will be swifter. We always recommend presenting projects as robustly as possible. Our international experience contributes to this, as we have to face very strict legislations in multiple jurisdictions.

What are Stantec's strategic plans for the future?
In what concerns Chile, we will focus on the aforementioned pillars, which are aligned with Stantec's global strategic plan. This plan will last until 2026, but our vision is long-term. Strategic plans tend to follow the directions of the former ones, as our past and future roadmaps are coherent among them. Mining will remain a key area for us, as we have the know-how and the experience, but we will incorporate all areas of expertise we deem appropriate. ■

Exceeding Standards in Infrastructure

"We are innovating in our core operations by developing equipment to reduce both reactive and water consumption. Our goal is not merely to meet minimum standards but to exceed them, seeking opportunities for responsible and sustainable growth."

Juan Andrés Campos, General Manager, **INGENALSE**

"A key differentiator for LEN in the market is its reliability. The company has built a reputation for being a dependable partner, consistently delivering high-quality results even in challenging economic conditions."

Julián Alvear Fernández, General Manager, **LEN INGENIERÍA**

"We have observed a growing openness among customers to embrace new technologies and approaches, recognizing the potential for marginal gains that contribute to significant improvements in their overall operations."

Andrés Rojas, Director, Automation and Digitalization, **ANDRITZ**

Iván Rayo

General Manager

JRI INGENERÍA

What are some of the standout projects JRI Ingeniería is working on right now?
One of the most notable projects is our contribution to Codelco's Chuquicamata underground project, specifically the Level 2 pre-feasibility phase. We are also supporting Codelco's Andina division, especially with their expansion projects, like the water recirculation systems. Additionally, we have been working on private sector projects with companies like BHP, AMSA, Capstone, Collahuasi and Anglo American, principally.

What are the current challenges and opportunities for Chilean engineering companies seeking to expand internationally?
International partnerships are one of the biggest opportunities for Chilean engineering companies. Many international firms are now required to include a local component when working in new markets. Our model, which focuses on collaboration with local firms, is well-suited for these types of environments. While Chile's mining industry is highly developed, other countries have younger sectors that present their challenges, particularly when it comes to technology adoption. But in general, Chile's mining sector is seen as one of the most advanced globally, which makes our expertise highly sought after in international markets.

What are the emerging technologies and practices in Chilean mining, and how does JRI Ingeniería incorporate these into its projects?
We are seeing some exciting developments in technologies like electromobility, automation and robotics. At JRI, we have been looking into integrating these technologies in several ways, such as using automation for mine transport and other fixed systems. We are also exploring how we can reduce human exposure in high-risk environments. We have started integrating data analytics and artificial intelligence into our operations to help optimize processes.

What is your vision for the future?
We have ambitious plans to grow at least 10% annually through 2030. A key part of our strategy will be focusing on digital transformation to improve internal productivity and enhance the services we provide to clients. ■

Oscar Vera

General Manager

FUGRO CHILE

Could you introduce Fugro and how you are involved in the mining industry?
We provide high-accuracy Geo-data and analyses at mining sites, translating surface and subsurface conditions into actionable insights. We are recognized specialists in tailings management, an area that has become crucial since the implementation of the Global Industry Standard on Tailings Management in 2020.

How do you see mining companies in Chile managing tailings today?
Chilean mining companies are actively aligning their practices with the Global Standard, striving for zero harm to people and the environment. Fugro is a key partner in this critical undertaking, providing comprehensive mapping, modeling, and monitoring of tailings dams. This includes detailed geotechnical investigations of both embankments and tailings basins, as well as seismic risk assessments and advanced field data analyses. By integrating these diverse Geo-data into robust ground models, we help mining companies improve efficiency, reduce risk, and understand their compliance with the Global Standard.

What major trends are you observing in Chilean mining?
The Chilean mining industry is under increasing pressure to balance growing demand with sustainable practices and regulatory compliance. There is growing awareness that integrating Geo-data insights throughout all phases of mine development improves safety and efficiency across the project life cycle.

Regarding workforce challenges, how is Fugro Chile attracting and retaining talent in mining?
In Chile and across the globe, Fugro attracts and retains highly qualified professionals by fostering a culture where people are valued for their expertise and their unique contributions. Beyond competitive employment terms, we invest in professional growth, offering specialized training directly relevant to the unique challenges and safety protocols of the mining environment in Chile. This commitment to continuous learning not only ensures our team operates at the highest standards of safety and efficiency but also provides opportunities for individuals to advance their careers while working on important projects with cutting-edge technologies. ■

Juan Castaño

CEO Chile

AMPHOS21

Could you summarize 2024 at Amphos21 and the company's achievements?
Over the last few years, we have been working with Codelco and Enami on Salar Maricunga, Salar Grande, Salar de la Isla and Salar Aguilar. We have several multi-year projects underway at Escondida and are also working with Capstone Copper, Lundin's Caserones mine, and on several of Codelco's projects. We have grown our turnover by approximately 40% in the last year. In 2018, we employed around 38 people, whereas in 2025, we are a team of 135 professionals.

We are offering new services, for example, providing environmental studies, and now we want to expand into soil decontamination, soil dewatering, and the application of AI and new technologies in mining.

Which of Amphos21's services have been most popular over the 12 months?
We are advisors in mining hydrogeology, primarily in groundwater management, characterization and prevention of water and soil contamination.

We also help with Management Aquifer Recharge (MAR), especially with saline water, that some companies can use to recharge to aquifers and reuse them in the future. This is something relatively pioneering in Chile, and something that we have been helping with in Europe for many years. ■

Cristián Álvarez

CEO

GEOBLAST

How does Geoblast contribute to safer and more sustainable mining operations?
Since 2008, Geoblast has had zero lost-time incidents, approaching 5 million hours without an accident, which spans 17 years. This relies upon a combination of well-trained teams and a strong safety culture.

In terms of sustainability, our environmental performance has been recognized with many awards, aligning with the industry's demand for low-impact, sustainable practices. As such, we developed a 10,500 m² geological core storage and analysis center in Pozo Almonte, setting a new standard in core management, drawing visits from Codelco, BHP, Collahuasi, and Antofagasta Minerals. We plan to replicate this model internationally.

Given your diversification and growth, what lessons can the Chilean mining industry learn from your evolution?
I believe our biggest lesson is that controlled diversification around an expertise focus creates long term resilience. As our companies are independent but interlinked, this allows for cross-collaboration and innovation. We are following a model similar to companies like Hexagon, which has made hundreds of acquisitions to consolidate capabilities, only on a smaller scale, and incubating internal ventures. This model promotes innovation and favors engagement among professionals. ■

Jerome Poujaud

Chile and Peru Development Director

VEOLIA

Which desalination projects do you have in mind for the future in Chile?
Desalination is a growing market, with several projects announced in Chile and Peru, which share the same hydrological scarcity. This represents an opportunity for Veolia, which provides a wide array of services in terms of desalination, ranging from design, build, operation, maintenance, and technical support for current and future desalination systems. Veolia's great asset is operating worldwide many models of plants from many manufacturers of different natures, such as potabilization, industrial treatment, or acid water treatment plants.

How does Veolia help its mining clients manage water more efficiently?
We own over 4,000 patents on water management, but also chemical products and other kinds of consumables needed for water treatment. This gives us the know-how to guide our clients on how to become more efficient, both in terms of performance and economically.

What are Veolia's plans for the future?
We provide technological solutions for mining clients in areas they face today, but also in new ones that will emerge concerning the scarcity of water resources. We are and will remain leaders in water solutions to ensure that mining can address these challenges in the future. ■

EQUIPMENT AND TECHNOLOGY

“Chile is the largest mining market in Latin America and is characterized by aging deposits, declining grades and increasing extraction challenges. These factors are driving mining companies to adopt new technologies more rapidly.”

Darko Louit
CEO
KOMATSU HOLDING SOUTH AMERICA AND KOMATSU CUMMINS CHILE

Image courtesy of Komatsu

The Quest to Square the Circle

Technology and sustainability driving Chilean mining's transformation

Chile has one of the most ambitious roadmaps towards decarbonization globally, with the country aiming to achieve carbon neutrality by 2050. This is a major challenge, particularly due to Chile's mountainous, longitudinal geography, which can prove cumbersome for electric grids, transportation, and fuel consumption. These obstacles impact OEMs as well, which have to adapt their products to such a daunting context while also complying with government sustainability requirements and their clients' needs concerning safety and environmental responsibility.

As José Luis Villalón Spoerer, general manager at Hilti, stated: "Mining companies are looking for solutions that enhance operational efficiency, improve worker safety, and reduce environmental impact, all at the same time. Our product and service offerings are strategically aligned to meet these interconnected challenges." The company is working towards complying with these requirements, minimizing disruption within the current workforce.

All these concerns point to automation as the solution, one of the key trends in the sector, particularly as incidents such as the one that occurred in Ancash, Peru, continue to mar the industry. Closely related to automation comes electrification, yet another challenge, given Chile's aging mining infrastructure. To complicate things further, decreasing ore grades compound all of these technological challenges, putting machinery under more physical and energetic stress. Fortunately, according to InvestChile, mining companies invest US$15 billion annually in machinery and technology, underpinning a will to surmount these challenges.

Opportunities in adversity

Declining ore grades are a major challenge for the whole Chilean mining value chain, with copper ores passing from an average grade of 0.90% in 2015 to 0.74% in 2023, according to market intelligence firm Project Blue.

"In Chile, we are seeing that the copper ore grades are declining. This means that miners need to move more material to produce the same amount of copper they were producing in the past. So, the customers are requiring larger machines with advanced technology to meet their needs. We are even considering developing new types of machines to meet these requirements," summarized Tetsuya Kitagawa, president and CEO of Hitachi Construction Machinery Latin America.

Recognizing the potential environmental and safety impact that larger bulks can imply, the company is focusing on new monitoring software that improves efficiency thanks to data diagnostics, and has partnered with Envirosuite to reduce noise and dust produced by the increased stresses their machines endure in Chile.

José Ignacio Urcelay, managing director at Scania Chile, declared: "Each client has a product customized to their requirements, and I believe this is what sets us apart. With decreasing ore grades and, therefore, an increased focus on productivity, adaptability is as important as ever. Furthermore, with more ore being mined to combat declining grades, the solutions we offer will be more customizable and therefore more effective in Chile."

This underscores one of the unique challenges posed by decreasing ore grades. With all mines being different in design and needs, solutions have to be tailored for each client and each mine. Keeping in line with sustainability concerns, Scania recently launched its Super line in Chile, enabling up to 8% fuel saving, and its Super Heavy Tipper line, which is undergoing tests running on Hydrotreated Vegetable Oil (HVO), a fuel made out of organic residues, for four major mining companies.

Also working on HVO solutions is engine manufacturer Cummins. "One of the most notable advancements is the approval for the use of HVO, a synthetic fuel, in our engines ranging from 19 to 95 liters. The fuel can be used either in full or as part of a diesel blend. In Chile, we recently carried out a dynamometric test at our workshop facilities using a blend of 80% diesel and 20% HVO," Miguel Flores, general manager, explained.

Moreover, Cummins also acquired First Mode, a company specializing in hybrid solutions. Flores remarked: "One of First Mode's main innovations is a hybrid battery kit for traditional diesel mining trucks, capable of reducing fuel use by up to 30%, depending on site conditions. Chile will be the first country to pilot this system, with a six-month trial to monitor performance. We aim to begin commercial rollout by 2027."

This underpins that the challenges posed by decreasing ore grades extend beyond customization and handling larger bulk, also necessitating increased fuel input. Furthermore, these innovations position Chile at the forefront of mining innovation worldwide.

In this regard, Komatsu also has solutions to increase fuel efficiency. "Komatsu Cloud, an ecosystem designed to capture and leverage data from equipment and production systems, allows us to gather information into a central data lake, which can be used to optimize operations," commented Darko Louit Nevistic, CEO of Komatsu Holding South America and Komatsu Cummins Chile, adding: "Another key innovation is our Power Agnostic truck platform. This approach allows for flexible power source transitions, from diesel to electric to potentially hydrogen fuel cells in the future."

TotalEnergies, which recently opened a lubricants blending plant in Chile, is also contributing to fuel efficiency. Daniel Fellhandler, general director at TotalEnergies, explained: "Our lubricants are highly technological, allowing up to 4% fuel savings in mining fleets, which has significant environmental and operational impacts. Additionally, we offer biodegradable lubricants, ensuring minimal environmental impact. Innovation is central to our operations."

Michelin is also advancing digital solutions that contribute to enhancing performance. "Through tools like MEMS 4, DBox, and Better Haul Road, we help clients monitor conditions in real time and manage tire performance; allowing for data-driven decisions, reduced tire wear, optimized fleet performance, and fuel efficiency," said Rafael Santo, general manager of Chile, Bolivia and Peru.

Autonomous and electric: The next frontier

Having established that carbon neutrality is a priority for both the government and the industry, and that decreasing grades imply heavier consumption, several companies have rolled up their sleeves to find solutions to tackle dependency on fossil fuels.

Sandvik remarks that the demand for electric and autonomous solutions has dramatically increased, with their presence in the country almost doubling in the last 12 months. But Chile's infrastructure is still not ready for this, despite challenges going beyond the material. "The bottleneck is in personnel training. I estimate it takes three to four years to train a professional who can autonomously manage an automation project. For electrification, there are several challenges. First is regulation; there is no clear regulation regarding electrification processes and permits, especially for underground mining. Second is infrastructure, as most Chilean underground mines are brownfield expansions rather than greenfield projects, requiring considerable investment for partial electric operations while still maintaining ventilation and coexisting with diesel machines," Ricardo Pachón, area vice president of sales Andean and Southern Cone at Sandvik, explained.

This is the reason why many clients are looking towards hybrid solutions instead. "We first approached automation through electric vehicles, a step which was very successful for us, but things seem to have reached a halting point in this regard. There are still no autonomous solutions for most of the equipment we work with, or at least competitive ones. Only in remote-controlled vehicles for underground mining were there important advances, and also in trucks," reasoned Pablo Lam Esquenazi, general manager of SK Rental.

EPIROC, despite also manufacturing fully electric machinery, views hybrid technology as the best alternative until problems surrounding electrification can be solved. "Many mines' infrastructure cannot support becoming fully electric. That is why hybrid technology is an excellent next step while battery technology continues to improve, for example. EPIROC is continuously pushing forward the boundaries of battery technology while also developing hybrid or trolley systems," says John Swift, general manager of Southern Cone at the company.

"Electrification brings many advantages beyond the lack of emissions, such as not paying for increasingly expensive fuel. The challenge is battery life. Vehicles should have enough battery life to complete a 12-hour shift for electrification to be feasible, but right now, technology only allows for an eight-hour shift with a 40-minute charge. Only two years ago, the total battery life was only enough for a six-hour shift, so probably within a year, this milestone should be met," said Fran Benito, corporate business manager at Andes Maq.

Focusing on automation, Multiservice Grúas sees many opportunities to enhance workplace safety by using robots. Felipe Fossatti, commercial director of the company, argued: "We want to work with robot dogs to enhance the reporting of safety and our control of the area of operations. It will allow us to better map the terrain where the crane will be located without risking lives, providing a great wealth of information without having humans there."

This will allow for unmanned craning operations, which also increases efficiency as the robots can scout locations inaccessible to humans.

Sandvik Ground Support, formerly DSI Underground, manufacturer of anchoring and monitoring solutions for mines, is also investing heavily in autonomous solutions, aiming at improving safety. "Sandvik is developing a completely autonomous system working with AI. It has been tested in Sandvik's tunnels in Finland, so once in the market, it will signify a revolution," Carlos Leigh, general CEO of Latin America, asserted.

The company is also devising other solutions, delving into safety, such as the Ultrabolt, that can map in real time the structural integrity of the mountain above it.

The challenges OEMs are facing are by no means small; some of them even seem intractable, but they are turning difficulties into opportunities to improve their products and devise ingenious new ones, which, thanks to technological advancements, allow for the envisioning of a future where Chilean mining manages to square the circle in addressing its complex challenges. ■

Image courtesy of Andes Maq

John Swift

General Manager Southern Cone

EPIROC

How is EPIROC capitalizing on the expansion of underground mining, and what is the added value of relying on your products?
Because of declining ore grades, mines must go deeper and be more efficient. It is in this scenario where companies like EPIROC, which offer solutions across the entire value chain, are more needed. Underground mining is not only about ore extraction, but also about how to do it in the most efficient way. This cannot be achieved only through equipment, but also thanks to devising new mining methods through consultancy, which EPIROC also provides.

When will fully automatic and electric underground mining prevail, and what is EPIROC's role in this?
Many mines' infrastructure cannot support becoming fully electric. That is why hybrid technology is an excellent next step while battery technology continues to improve. EPIROC is continuously pushing forward the boundaries of battery technology while also developing hybrid or trolley systems, contributing towards the future of mining while offering solutions to make mining greener today.

What are EPIROC's ESG policies?
For EPIROC, ESG is deeper than just policies; it is in our DNA. We are aligned with the UN's objectives and have taken active steps to implement specific policies, whether it be in renewable energies or leading the charge towards tire recycling in Chile. We are also a safety champion, not only pushing towards automation but expanding our ecosystem towards areas directed at protecting people, such as collision avoidance or monitoring.

What are EPIROC's plans for the rest of 2025 and beyond?
We will shortly be launching the new Minetruck MT65 S in Chile. We are investing heavily in facilities in Antofagasta and Copiapó, but also in Argentina, which is part of the same business unit for us. In the case of Argentina, our specific focus is on the San Juan province, because we firmly believe in its mining potential. ■

Darko Louit

CEO

KOMATSU HOLDING SOUTH AMERICA AND KOMATSU CUMMINS CHILE

Can you provide an overview of Komatsu's performance in the last 12 months?
In Peru, we started delivering a new fleet of 980 SE trucks to Antamina, where we have recently been awarded a second batch of units. In Chile, we have expanded our autonomous fleet operations and introduced the P&H 4800XPC shovel, which is the largest shovel in the market.

How is Komatsu approaching technological innovation and acquisitions?
Komatsu has developed a comprehensive technology roadmap focused on creating a smart, cleaner, safer workplace. Our technological approach centers on automation, optimization, analytics, artificial intelligence for operational and planning decisions, and decarbonization. We are particularly focused on developing technologies that can help mining companies optimize their operations, reduce environmental impact, and address challenges such as worker safety and remote location staffing. Our recent acquisitions are strategically aligned with these objectives. As an example, we have acquired a Chilean company that complements our mining technology solutions, particularly in the area of production control and fleet management, enhancing our capability to help our customers to optimize their operations.

Can you elaborate on Komatsu's approach to data and technological integration?
We have developed Komatsu Cloud, an ecosystem designed to capture and leverage data from equipment and production systems. This platform allows us to gather information into a central data lake, which can then be used to optimize operations. The innovative aspect of our approach is creating an open ecosystem where not just our internal tools, but also third-party developers can create solutions that benefit mining customers. Another key innovation is our Power Agnostic trucks platform. This approach allows for flexible power source transitions - from diesel to electric to potentially hydrogen fuel cells in the future. By designing equipment with the possibility of changing power sources, we ensure our customers can adapt to emerging technologies without requiring equipment replacement or major, expensive transformations. ■

The OEM Market

"Chile is one of Latin America's leaders in renewable energy adoption and sustainability practices, driven by the strategic needs of the mining industry. These high standards have a ripple effect across other industries as multinational clients value partners that align with their sustainability commitment."

Daniel Fellhandler, General Director, **TOTALENERGIES CHILE**

"Working with mining companies is not only a source of pride, but enables us to develop global services that extend beyond cranes, delving into sustainability and technology."

Felipe Fossatti, Commercial Director, **MULTISERVICE GRÚAS**

"We have developed a model that eliminates intermediaries, ensuring strong, direct relationships with our customers. Our field teams work directly onsite with workers, understanding their challenges and providing support, while our relationship managers develop long-term partnership frameworks."

Luis Villalón Spoerer, General Manager Chile, **HILTI**

"We are working with Sany, the fifth largest manufacturer of machinery in the world, which has had exponential growth. In just 35 years, it has produced shockwaves throughout because of its innovation and offering of integral solutions."

Fran Benito, Corporate Business Manager, **ANDES MAQ**

"We have created a re-rental model that is increasingly taking off. Today, about 25% of our fleet is owned by third parties. This gives us great flexibility against market instability, and there is still room to keep growing in this sector."

Pablo Lam Esquenazi, General Manager, **SK RENTAL**

"We have successfully strengthened our position as a leading partner and primary supplier to mining in Chile. This progress has been driven by our close collaboration with our strategic partner, Komatsu, and our shared commitment to innovation and operational excellence."

Miguel Flores, General Manager, **CUMMINS CHILE**

"Chile serves as a hub for testing new mining solutions. Many of our tire development and validation programs are conducted in partnership with Chilean mines, thanks to the high quality of local operations and our strong presence in the country."

Rafael Santo, General Manager Chile, Bolivia and Peru, **MICHELIN**

Ricardo Pachón

Area Vice President of Sales Andean & South Cone

SANDVIK

What have been the most significant developments for Sandvik Chile in the past 12 months?
Our presence has practically doubled in terms of the amount of equipment over the year. Our service center has gained great relevance, with almost 90% utilization of our Copiapó service center attending to clients in the area. Our focus has been developing local personnel. We are establishing strategic alliances with universities and technical institutes in the region to employ and develop local talent.

What products have seen the highest demand in Chile recently?
There is strong demand for autonomous equipment. We already have a considerable fleet working in underground equipment, and we have some units working in autonomous mode on the surface in Chile. The trend is clear - new projects are focused on automation and electrification for surface operations. In underground operations, the trend leans more toward automation with some degree of electrification. We are seeing a certain tendency to move toward hybrid equipment instead of 100% electric.

What are the main barriers to adopting automation and electrification?
The bottleneck is having staff trained in network management, software management, and campus management is limited and takes time to develop. I estimate it takes three to four years to train a professional who can autonomously manage an automation project.

For electrification, there are several challenges: there is no clear regulation regarding electrification processes and permits, especially for underground mining, and most Chilean underground mines are brownfield expansions requiring considerable investment for partial electric operations while still maintaining ventilation and coexisting with diesel machines.

How does Chile compare to neighboring countries in mining technology adoption?
Chile is the reference point in South America. The mines here are much more mature in adopting new technologies. 90% of our automated fleet is working in Chile, and it is similar for other companies. ■

Carlos Leigh

Regional CEO Latam

SANDVIK'S GROUND SUPPORT DIVISION

How deep does innovation run in Sandvik Ground Support Division?
We have centralized innovation within Sandvik, which boasts a larger R&D department, and we incorporated it with our ideas, products, and solutions. Our anchoring products are fully integrated with Sandvik's machinery, enabling both the development of tailored solutions and the design of efficient installation methods. A great example of this seamless communication and integration is our new Automatic Resin Injection (ARI) system for bolters. ARI delivers high-strength resin capsules, allowing for simultaneous drilling and installation, eliminating the typical challenges associated with this process.

What role do automation and AI play in your future products?
Sandvik is developing a completely autonomous system working with AI. It is a two-boom, large piece of equipment. It has been tested in Sandvik's tunnels in Finland, so once in the market, it will signify a revolution. On our side, we are developing systems that feed live tunnel information. The UltraBolt allows for measuring the bolt's residual capacity. The system works through ultrasounds, providing insights as to whether the zone is safe or not, if the bolt is working, and how much useful life the bolt has left. Today, we can map a whole network of tunnels thanks to the bolts installed.

What are your plans for the future, and how do they align with the future of underground mining?
Changes in open pit mining legislation in some countries and decreasing mineral grades will drive a shift towards more underground mining. However, this transition will not be immediate, it requires exploration, design, and permits. From 2027-2028 onwards, we will probably see more movement in the region. Our main target for 2025 is to continue the integration with Sandvik, which is allowing us to create joint and innovative solutions that add value to clients, and to grow in the future. ■

Tetsuya Kitagawa

President and CEO

HITACHI CONSTRUCTION MACHINERY LATIN AMERICA SPA

What is your portfolio of products and services for the mining sector?
Currently, we provide middle and large-sized excavators and trucks to the mining sector through our distribution network to support mining operations. We also have a portfolio for mineral processing through our group company, H-E Parts and Bradken, which provides crusher liners and mill liners. Additionally, we have significant digital technology capabilities. Our group company, Wenco, provides data analytics processes such as fleet management and an asset monitoring system to support their mining operations efficiently.

What are the current market trends for Hitachi Construction Machinery's products and services in Chile?
In Chile, we are seeing that the copper ore grades are declining. This means that miners need to move more material to produce the same amount of copper they were producing in the past. So, the customers are requiring larger machines with advanced technology to meet their needs. We are considering developing new types of machines to meet these requirements. Also, we are currently planning to establish a warehouse in Chile to ensure we can deliver parts quickly to our customers.

How do you plan to attract and retain talent in the competitive mining industry?
While competitive compensation packages are important, one of the most attractive aspects of working with us is that we are a new company in the region. This allows employees to make a significant impact and develop their goals. We plan to invest in the right people, regions, and facilities to ensure we properly serve our customers.

What are your company's growth plans in Latin America for 2025 and beyond?
A key part of our strategy for success in this market is being visible and demonstrating our capabilities directly to customers. We are investing in this region to showcase our capabilities and support both our customers' operations and our dealers. ■

José Ignacio Urcelay

Managing Director

SCANIA CHILE

What are the main updates from Scania's operations in the Chilean mining sector?
2025 marks 30 years of operations in Chile, with 16 branches in total throughout the country. In the main mining region in the north, we have five branches and five service points, all of which grew very strongly, emphasizing that the mining industry is an engine of growth for Scania here. This has been the case for several years now, and we are investing US$5 million in a plant in Antofagasta to capitalize on this growth, which will become Scania's main hub for mining in Chile and is expected to begin operations at the start of 2026. Furthermore, in Coquimbo, we have invested US$2 million in a workshop that should open in Q2 of 2026.

Mining is becoming an increasingly competitive industry, and because of this, we are seeing large investments of US$15-20 billion on some of the major projects. This is where Scania can be a great ally to mining companies, as we can increase productivity and have a great presence in the country, whilst being competitive on sustainability and cost.

What factors are preventing mining companies in Chile from going fully electric?
I think the long-term issue with new trucking technology and solutions is their range and the charging network in Chile, which is currently under construction. Our vehicles at Scania have a range of approximately 1,000 km, compared to only 300-400 km in our electric truck range, with no difference in price. An electric vehicle in 2025 can cost three times that of the equivalent machine that runs off diesel, and so until we reach a point of price equity, there is no economic motivation for mining companies to adopt these solutions. We are starting to see more investment into charging stations across Chile, however, there is still work to be done on this matter. ■

Pushing the Limits

Handling heavy metal with light footprints

Even with its global leadership, the mining industry in Chile is still pushing itself to higher standards. One way in which this is noticeable is the focus on sustainability within comminution and material handling companies. This has been achieved thanks to huge investments in crucial technologies, with several trends emerging, such as grinding ball recycling, dry-tailings solutions, usage of data-based diagnostics, or longer product life, just to name a few. But sustainability is not the only field in which the sector is raising the bar, with productivity and navigating Chile's increasing regulatory hardships being other areas of innovation. Moreover, several companies have recently opened new facilities, demonstrating their willingness to go further.

Sustainable innovation in mining's core processes

ME Elecmetal, which introduced its QuickScan technology in 2024, and completed acquisitions in Peru and South Africa to make its offerings more holistic, has also secured a CORFO subsidy to develop a solution for recycling grinding balls and recovering environmental liabilities in the grinding process. "We focus on reducing the mining industry's carbon footprint by offering solutions that allow companies to repair components rather than purchase new ones when it is more environmentally sustainable," explained Jose Pablo Dominguez, general manager.

Likewise, Magotteaux also offers in Chile a full range of grinding media, and in 2024, it signed a five-year contract with Codelco for grinding balls that incorporates a 100% supply model from recovered material. Enrique Vargas, country manager in Chile and Peru, noted: "More than 80% of our raw materials come from recycled products. We invest in energy efficiency and renewable energies while applying an active reduction, recovery, and recycling strategy." Furthermore, the company has also focused on process optimization and impact applications as part of the Sigdo Koppers Group since 2013.

In yet another twist to this technology, Tecnología en Transporte de Materiales (TTM) and ME Elecmetal turn waste into value. Both joined to form the Footprint Alliance, which recovers contaminated mill balls for reuse. TTM, the material handling company, traditionally focused on conveyor components, dust control and maintenance of conveyor belts in open-pit and underground mines, has invested almost US$6 million in a pilot plant for the Footprint Alliance in Nogales. "Our process separates usable mill balls, metal scrap, and clean minerals. Previously, this work was done manually, but our automated plant requires only four people to operate. In October, we secured a CORFO award, receiving CLP$3 billion in subsidies," described Phillipe Hemmerdinger, TTM's CEO.

Metso was also celebrating the opening of a new facility in a positive 2024 for them in Chile, positioning it to be part of the new large-scale projects anticipated in the coming years. "A major milestone for us was the inauguration of our first large-scale recycling plant for mill linings in Chile. This facility can separate and recycle steel and rubber components, addressing sustainability challenges in mining equipment," said Eduardo Nilo, CEO of Metso in Chile. He continued: "We are also exploring advanced filtration technologies, such as economic tailings filtration, which allows for water optimization and more sustainable processing methods."

Cbb Cales also has plans to become greener, with a strong focus on sustainability and safety. As Ulises Poirrier, CEO of the company, declared: "One of our key priorities is reducing our carbon footprint. To that end, we're planning the installation of two high-efficiency vertical kilns in Chile, equipped with cutting-edge global technology. These kilns will be more energy-efficient and significantly reduce CO2 emissions, contributing to a lower environmental impact. This commitment is fully aligned with our sustainability agenda, which emphasizes responsible growth and respect for the environment and local communities."

The firm has had a busy 2024, with substantial investments amounting to US$100 million, mostly directed towards operations in the Argentinian market. They are also in the process of increasing their lime production by 30% thanks to two new kilns.

Weir experienced a dip in new projects during 2024 but supplemented this with growth in aftermarket services and digitalized solutions. "Monitoring and diagnostic technology are becoming more important, as seen through the growing number of operations centers that are opening away from the mine site. Whilst these are not revolutionary technologies, Weir's ability to collect data on our products and enact changes that optimize them will separate us from the rest of the industry," said Martin Brenner Knoch, regional managing director of Latam for Weir.

Chile's transformative path in material processing

Data usage is an emerging trend in comminution, just as in material handling. For the latter, it is one of many mechanisms to cope with decreasing ore grades and the subsequent larger bulks that machinery has to carry, with the added difficulty that this must be done faster to keep up with productivity levels.

As part of the BEUMER Group, FAM recently experienced its largest order intake in Chile since entering the market in 2000. One of these orders from Codelco will be the largest spreader in the Southern Hemisphere and all of the Americas. Traditionally, systems used to process 900 t/hour, but nowadays, the number is closer to 15,000 t/ hour. To counter the increased environmental impact of this, FAM is focusing on generating renewable energy to sustain operations. "Last month, we reached a significant milestone by not only

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Image courtesy of Glencore

Sergio Zamorano

CEO

FAM LATIN AMERICA

> Traditionally, we used systems that processed 9,000 t/hour, but now many projects require systems capable of handling 15,000 t/hour, with some plants even planning to operate multiple lines at that scale.

Can you summarize FAM's 2024, including key projects and milestones?
For FAM, part of BEUMER Group, this year marked our largest order intake in our 24 years in Chile. We secured some remarkable projects, including two for Codelco. One involves a conveyor upgrade, while the other includes what will be the largest spreader in the southern hemisphere and the Americas—likely the largest built in the 21st century. The project is a completely new concept designed to meet a unique requirement of operating on a mountain slope.

Why is such a machine needed in mining presently?
As we face lower ore grades that require more waste removal, we increasingly need larger capacities to meet demand. When I returned to Chile 30 years ago, many of the mines we now work with were expected to close by the 2000s due to low grades. However, the rising demand for copper has made it economically viable to process ore that seemed unfeasible two decades ago. This shift is not confined to just one operation; traditionally, we used systems that processed 9,000 t/hour, but now many projects require systems capable of handling 15,000 t/hour, with some plants even planning to operate multiple lines at that scale.

What technologies are driving your mining innovations?
We are combining traditional experience-based structural analysis and mechanical expertise with cutting-edge technologies like digitalization, image recognition, and automation. Our strategy also includes enhancing client access to real-time support. This global network enables us to advance digitalization as a core part of our strategic development. This shift also includes more advanced, sometimes autonomous, control systems and smarter communication methods, while our expertise pool allows us to confidently set a new benchmark with a pipe conveyor project involving a 26-degree incline and 3,000 t/hour of copper ore.

What role does Chile play in global mining innovation?
In the 21st century, Chileans are poised to play a major role in shaping the future of material handling, thanks to a strong tradition and hands-on learning approach. The key to success in this field is practical experience. Chile's demographic advantage lies in its strong cultural respect for mining, which remains integral to the national identity. Unlike in Europe or Brazil, where mining has lost some of its appeal, mining continues to drive the economies of Chile and Peru, contributing significantly to their exports. As a result, Chile is well-positioned to continue its legacy of innovation, with a new generation eager to learn and lead. By mid-century, experts from Chile, India, and South Africa will likely be at the forefront of the industry, drawing from past lessons to shape its future.

How is your progress with the carbon-neutral warehouse?
Last month, we reached a significant milestone by not only achieving carbon neutrality but also becoming financially neutral in terms of energy costs. The efficiency of our solar panels in La Negra, Antofagasta, has been exceptional, generating around 60% of installed capacity within 12 hours of sunlight, effectively eliminating our energy expenses. We have made incremental progress toward greater sustainability, such as transitioning administrative vehicles to smaller, more fuel-efficient models. However, fully electric mining trucks remain unfeasible due to long distances, high elevation changes, and insufficient charging infrastructure.

How do you balance international standards with the realities of operating in Chile?
In 2023-2024, we set a safety benchmark within our group, achieving over a million accident-free work hours, with mining operations in Chile and Peru maintaining a strong safety focus. In sustainability, we collaborate globally to align efforts, although locally we lag behind innovations like China's 14 km solar-powered conveyor. Acknowledging regional differences, we foster continuous discussions and knowledge-sharing.

What are FAM's strategies and goals for the future in Chile?
Our growth is exceeding expectations, positioning us strongly in the market as we prepare for substantial demand for material handling. Key challenges and opportunities include advancing technologies such as tailings handling, pipe conveyors, and large crawler-mounted machines, ensuring our continued activity in the industry.

Could you comment on your strategy for the broader Latin American region?
Peru offers significant opportunities through new projects and the expansion of existing operations, particularly in services. In Brazil, we maintain a strong position and foster collaboration. We also see potential in Argentina, where we are partnering with a local company to support growth. ■

Andrés Costa

Managing Director

TAKRAF CHILE

> There is a consensus that large new deposits like Escondida are rare, but the development of multiple medium-sized mines, possibly centralized around shared infrastructure, offers a significant opportunity.

Could you provide us with an update on TAKRAF Chile's activities?
2024 was exceptional for TAKRAF Group in Chile and Peru, securing economically, environmentally, and strategically critical projects. We are involved in one of the world's largest tailings concentration projects. While TAKRAF has been known for material handling, our DELKOR liquid-solid separation technologies are now gaining prominence, strengthening our leadership in mining and environmental management.

Could you elaborate on the benefits of TAKRAF Group's technologies?
We offer technologies to handle and process minerals, with responsible tailings management a top priority. While paste tailings exist, Dry Stack Tailings (DST) are emerging as the most viable solution, and we have successfully integrated DST systems in Brazil. Combining material handling with liquid-solid separation lets us deliver integrated solutions. We are expanding product lines like filter presses and investing in technology to make waste management economically viable.

How is the trend of declining ore grades impacting mining operations?
Lower ore grades mean that more material must be processed to extract the same amount of metal, which in turn increases the need for crushing, material handling and all related processes. Addressing this requires maximizing throughput with minimal capital investment. Many opportunities are emerging in the area of system upgrades and retrofits, where new technology enables the use of existing infrastructure with enhanced capacity by increasing speeds and installed power. However, ultimately, everything needs to get bigger.

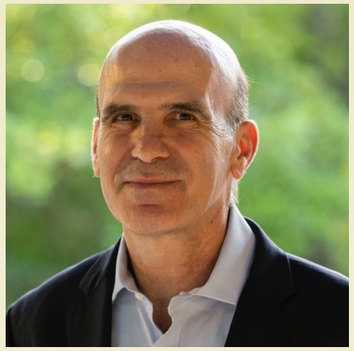
What initiatives has TAKRAF Group implemented in Chile to address the workforce shortages?
We have developed a wide range of programs focused particularly on attracting young talent. Beyond offering specific benefits, we highly value workplace flexibility. Our hybrid work model has been extremely well-received internally. Surveys show that flexibility is one of the most appreciated benefits among our employees. Externally, industry associations like APRIMIN have done tremendous work improving the image of mining in society, which supports our internal attraction and retention efforts. Over the last two years, we have increased our workforce by 150%, with a strong focus on professional development and training.

Are there opportunities for TAKRAF Group to expand beyond Chile?
As TAKRAF Group in South America, we have offices in Chile, Peru, and Brazil. We are closely monitoring Argentina for its investment potential and seeking early-stage involvement in high-feasibility projects. Additionally, medium-sized mining opportunities are growing across South America, including Chile. There is a consensus that large new deposits like Escondida are rare, but the development of multiple medium-sized mines, possibly centralized around shared plants or infrastructure, offers a significant opportunity. TAKRAF Group has a strong advantage here, with our systems capable of integrating operations across multiple pits in a cost-effective manner.

What challenges do you foresee in Chile and the broader mining industry?
Our clients will not be able to move at the pace that the market demands without deep reforms to the permitting system. Projects cannot afford to take 10 or 15 years to develop. This affects project feasibility, as delays dramatically impact NPV. In the supplier sector, a major challenge is the need for greater synergy among different players.

Could you comment on how TAKRAF Group supports sustainability through its products and technologies?
Our DST systems can recover over 94% of water, reducing environmental impact, while also significantly increasing safety. Our conveyor systems replace mobile equipment, contributing to mine electrification and reducing emissions. TAKRAF Group has pioneered numerous In-Pit Crushing & Conveying (IPCC) systems, bringing crushers closer to extracted material, reducing haulage needs, and improving energy efficiency. We are also advancing technologies such as our new generation BQR flotation cells, which boast higher recovery rates and lower energy consumption. These have already proven their worth in gold and nickel in Australia and PGMs in South Africa.

What are TAKRAF Group's growth plans looking toward the future, especially with the 300th anniversary approaching?
TAKRAF 300 is the name of our overall Group strategy that coincides with our 300th anniversary. Our growth strategy is ambitious, and we aim to increase our best-in-class position for several technologies that we provide. While there may be short-term volatility, the long-term fundamentals are strong. Our focus is on sustainable, planned growth in line with market realities, recognizing that mining is a marathon, not a sprint. ■



Philippe Hemmerdinger

CEO

TECNOLOGÍA EN TRANSPORTE DE MATERIALES (TTM)

> We aim to ensure every recovered material has a designated use — mill balls for reuse, metal scrap for foundries, and clean minerals for continued processing.

Can you give us an update on TTM and your operations?
At TTM, we operate three main business lines: product distribution, projects, and services. In product distribution, we supply conveyor components and industrial solutions, including conveyor belts from Continental and other manufacturers, rollers and pulleys from the Rulmeca Group in Europe, Scrapers from Starclean, magnets and sorting equipment from Steinert, and many others. This segment represents approximately one third of our total revenue.

In projects, our primary focus is on dust control, transport systems and others. We are currently completing two major projects in Radomiro Tomic for oxide and sulfur crushers. Our approach suppresses dust instead of merely absorbing it, achieving over 90% efficiency in removing PM10 particles, ensuring compliance with air quality regulations. Dust control has become an urgent priority, particularly in regions like Sierra Gorda, where environmental regulations are stringent. Our expertise lies in designing dust suppression systems for transfer points and compact units for conveyor belts and underground applications.

In services, we hold a key contract with Chuquicamata, where we manage the maintenance of conveyor belts in both the open-pit and underground mines. This includes working on some of the strongest and most demanding conveyor belts in the world.

Can you tell us about the Footprint Alliance collaboration and its significance in the mining industry?
During Covid, we partnered with ME Elecmetal, which supplies mill balls for SAG mills. They needed a solution to recover used mill balls that degrade in diameter but remain usable, but were contaminated with metal scrap and magnetite. Since we specialize in sorting and separation equipment, we collaborated to form Footprint Alliance and invested nearly US$6 million in a pilot plant in Nogales, 100 km north of Santiago. We have been operating for a year, receiving materials from various mines. We recently secured a contract with Teck Carmen de Andacollo to clean 13,000 t of contaminated mill balls, expecting to recover 30-40% for reuse. Our process separates usable mill balls, metal scrap, and clean minerals. Previously, this work was done manually, but our automated plant requires only four people to operate. In October, we secured a CORFO award, receiving CLP$3 billion in subsidies. We are investing another US$2 million to scale this project into an industrial process.

How does Footprint Alliance fit into mining's future technological transformation?
We aim to ensure every recovered material has a designated use — mill balls for reuse, metal scrap for foundries, and clean minerals for continued processing. We plan to integrate crushing and processing within our facility to maintain a steady material flow. Instead of selling standalone equipment, we offer both the equipment and service to guarantee continuous operations.

Given the trends in mining expansion and declining ore grades, how will this impact TTM's business?
As ore grades decline, more material must be moved to maintain production levels, increasing conveyor wear, rollers, and system expansions. While greenfield projects are limited, brownfield expansions remain strong. We aim to maintain our service sector while focusing on secondary mining. Chile has over 50 million t of recoverable copper in dump sites and tailings. While Chile's market share in global production has dropped from 32% to 20% in a decade, secondary mining presents a significant opportunity. Footprint Alliance plans to finance and operate plants, providing full-package solutions rather than just equipment.

What do you hope for from Chilean government regulations in mining?
We must learn from global examples like Germany, where rapid energy transitions caused setbacks. While sustainability is essential, change must happen gradually to maintain competitiveness. Excessive taxation, royalties, and bureaucracy slow down growth. Mining companies need stability and efficiency rather than excessive legal and regulatory burdens. Chile must balance environmental concerns with economic sustainability, ensuring growth without overburdening industries.

What are TTM's plans for 2025, and what goals do you have moving forward?
For 2025, we plan to reinforce our team, focusing on training and equipping them with the tools to handle our rapid growth. We aim to explore AI, which is new to our market, and integrate it into our operations. We will continue expanding our projects, delivering quality results, and maintaining our reputation for efficiency and competitiveness. Our goal is steady, responsible growth while providing excellent service. ■

Andrés Osorio

General Manager

SISTEMAS DE TRANSPORTE DE MATERIALES (STM)

> Right now, Chilean mining's biggest challenge is not Peru or Argentina but Africa, which is attracting considerable attention from Chinese and Russian investments.

Can you give us an update on STM's performance for 2024?
Overall, the market is quite dynamic, and we expect this to continue into 2025 and 2026. Many of our commercial projects are nearly complete, and we have high expectations for these.

In 2024, we worked on several projects aimed at increasing capacity. For example, we worked on a project with Escondida to extend the gravel dump conveyor, and on another project where we had to deliver pre-assembled equipment to minimize installation time within existing plants. These projects were critical because they needed to be done during plant shutdowns to minimize production losses.

How would you describe the geographical distribution of the mining industry in Chile?
Large-scale mining in Chile is located in a fairly limited geographical area, from the center of the country to the Tarapacá region. The geography in this area allows for multiple logistical points from which each mining zone can be supplied, such as the cities of Rancagua, Santiago, Los Andes, La Serena, Copiapó, Antofagasta, and Iquique. This is a great natural advantage that our country has, as it makes it easier for us to respond to customer needs.

How is digital transformation affecting mining in Chile and STM's operations?
Chile has been a leader in digital transformation particularly for mining. For many years, maintenance relied on collecting data from equipment, which was once done manually, but now it is fully automated. Data is automatically gathered from each component and sent to a central database for analysis to determine maintenance needs. Preventive maintenance has become the standard as most companies adopt this data-driven approach.

What would you like to see in terms of regulation changes in Chile?
The key issue is permits. It is important to ensure that projects comply with environmental norms and community interests, but processes need to be clearer. Many projects end up in judicial disputes, which delays the process. For example, the Dominga project was approved by environmental authorities but still has not been given the final permit. The government should prioritize projects with clear investment commitments and avoid unnecessary delays, especially since some projects have been in the pipeline for years.

How do pipe conveyor and modular conveyor systems aid mining operations?
Pipe conveyor systems are mature technologies, and our clients are very familiar with them. The challenge with tubular conveyors is that they are only suitable for fine materials, not coarse materials like those in mines such as Chuquicamata Underground. However, tubular conveyors are very effective in projects at ports, especially for transporting materials like copper concentrates to ships. This technology helps reduce dust emissions because the conveyors are enclosed.

Modular systems greatly improve the productivity of mining plants, especially in high-altitude operations where installation time is usually restricted. A modular system can be assembled in a fraction of the time compared to traditional setups, which is crucial when working in difficult conditions. This helps speed up installation and increases the plant's overall productivity. However, this technology is more expensive, so it requires close collaboration with the client to ensure cost-effectiveness.

How does STM view the mining sector in Peru and its relationship with Chile?
The Peruvian mining market is large and has different challenges, but it complements Chile's mining industry. Right now, Chilean mining's biggest challenge is not Peru or Argentina but Africa, which is attracting considerable attention from Chinese and Russian investments. While Chile remains a leader, the demand for copper is greater than supply, and we cannot predict what will happen in the next 15 years, especially with discoveries like the large copper deposit in Tibet, which could affect global prices.

What is STM's strategy for 2025, and how do you plan to strengthen your position in the Chilean market?
Our strategy is to capitalize on the current favorable moment for mining. We offer clients specific expertise in conveyor systems, with a team of highly experienced individuals who can respond quickly to the needs of material transport systems. We aim to build closer relationships with our clients, offering direct contact with experts who can deliver projects quickly and reliably. This sets us apart from companies that focus on standard equipment and enable us to respond more flexibly to market needs. ■

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achieving carbon neutrality but also becoming financially neutral in terms of energy costs. The efficiency of our solar panels in La Negra, Antofagasta, has been exceptional, generating around 60% of installed capacity within 12 hours of sunlight," highlighted Sergio Zamorano, the company's CEO.

Also noticing increased capacity demands from clients was STM, which extended conveyor belts from 10,000 to 12,000 t/hour. Despite the environmental steps the industry is taking to offset the increased amount of material mined, problems are still present at a bureaucratic level. Andrés Osorio, general manager of STM, outlined: "The key issue is permitting. It is important to ensure that projects comply with environmental norms and community interests, but processes need to be clearer. Many projects end up in judicial disputes, which delays the process."

With this need for increased capacities also comes an increased possibility of accidents and problems, and enhanced tire and wear on equipment. "Decreasing ore grades requires transporting larger bulk faster. This is a serious challenge that can entail enhanced wear of materials; belt misalignment is a common problem, which can produce fires; or the spilling of material and dust, causing pollution," as Fernando Miller, managing director for Latin America at Flexco, confirmed.

Flexco is currently the fourth largest conveyor supplier in the world, and it is growing rapidly in Chile's aftermarket due to the aforementioned enhanced stress that belts endure, providing service tools, bespoke solutions, and products that have built-in services for predictive maintenance.

Martin Engineering has also encountered this problem across jurisdictions, having focused on product life. Rodrigo Trevenzolli, regional director for Latin America at the company, elaborated: "This challenge has become increasingly common, as conveyors are required to handle higher tonnage and a broader range of materials. Thus, we are collaborating with our customers to deliver products with longer life spans and simplified maintenance procedures enabling conveyors to withstand heavier loads while maintaining — or even improving — operational speed. Of course, solutions must be customized to each customer's needs. Some of them will aim for mining larger volumes to compensate for lower grades, while others will focus on mining less material with higher grades."

Being the main conveyor supplier in Chile, the company has launched two new products into said market, the Cleanscrape and Orion systems, focusing on endurance and workplace safety.

Also, looking after safety is Multotec, a company specialized in mineral classification consumables and capital equipment. "One major challenge is that suppliers are the majority of workers in a mine. For every four people working in mining, three are suppliers. This means that transformation must come primarily from us", comments Mario Saavedra Vergara, general manager.

With such a recurring presence on mine sites, it is only logical for providers to accompany their clients throughout the mining process, providing key insights and services to

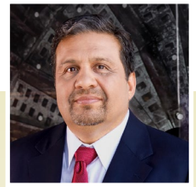
Joerg Von Loebenstein
Owner and Engineering Manager
TECNIPAK

> Peru has been more conservative in adopting new technologies. In Chile, falling ore grades and rising environmental and productivity pressures forced early and rapid innovation.

their partners. "Clients seek strategic partners who add value from the early stages. Our differentiator is our presence with the client on-site, understanding their real operational needs. We provide advice on how to achieve their objectives, whether it is improving maintenance intervals, increasing throughput, or adjusting particle size to fit upstream or downstream processes. It is part of the journey to become true long-term partners to the mining operations we serve," Saavedra Vergara remarked.

Multotec has recently partnered with Zip Technik and Robins to devise new screening equipment, while also working with local manufacturers to decrease the company's carbon footprint.

Glencore Technology has also toiled towards this end, making their signature Jameson Cell more eco-friendly.



Eduardo Nilo
President South America
METSO

> As grades decline, ores become harder. This means our equipment must be increasingly sophisticated in how it processes these materials.

"One of our primary sustainability initiatives is the reduction of CO2 emissions and energy consumption. We have developed the Jameson Concentrator, which integrates the Jameson Cell with the IsaMill. By combining both technologies, we can reduce CO2 emissions by up to 140% and lower capital expenditures by up to 160% for both greenfield and brownfield projects. This makes the Jameson Concentrator a very competitive and successful solution today. We expect competitors to eventually follow suit and adopt similar strategies to achieve this level of efficiency," affirmed Christian Pastén Cortés, regional business development manager at the company, about a critical initiative to enhance the competitiveness of a product that, while well-established in other jurisdictions, is only starting to gain footing in the region. ■

Ulises Poirrier

CEO

CBB CALES

> As part of our investment plan for Chile and Argentina, we will install three new state-of-the-art kilns to meet the rising demand from customers in large-scale copper and lithium mining.

Can you summarize the progress made by Cbb Cales over the past 12 months?
During this period, the company solidified its presence in Chile through key infrastructure projects. Among the most notable milestones were the investment in a new storage and distribution center in Pozo Almonte and the expansion of grinding operations in Copiapó. These initiatives are part of a broader strategy aimed at strengthening logistical and operational capacity across Chile's major mining regions. In addition, within the lime business, we made progress in Antofagasta with the environmental impact assessment for two new kilns, scheduled to begin operations in 2027.

How do you assess the current copper and lithium markets, and what impact do they have on Cbb Cales?
Copper remains a critical industry for both Chile and Argentina, while the lithium sector has gained remarkable traction in recent years, especially due to its role in powering electric vehicle batteries, which continue to grow in global demand. As part of our investment plan for Chile and Argentina, we will install three new state-of-the-art kilns to meet the rising demand from customers in large-scale copper and lithium mining.

What is your current production capacity, and what is the potential for expansion in Chile and Argentina?
Cbb Cales has launched a five-year, US$100 million investment plan, with a strong focus on expanding operations in Argentina. Despite being in an expansion phase, our production has remained steady and uninterrupted. Today, our facilities have an installed production capacity of 1.2 million t/y.

With environmental permits currently underway, we plan to increase that capacity by an additional 900,000 t/y through the installation of two new kilns in Antofagasta and to triple our production in Argentina.

How has technology recently influenced the development of the lime industry?
To maximize lime efficiency and develop tailored solutions for our clients, Cbb Cales established an 'Applications and Innovation Center' in Antofagasta, unique in South America. This testing center replicates the key industrial processes where lime is used, such as copper, lithium and gold processing, gas desulfurization, effluent neutralization, and heavy metal abatement. With the support of our specialized team, we help clients optimize lime use in their operations by designing custom solutions that create added value and improve process performance.

What steps has Cbb Cales taken regarding safety and sustainability?
To safeguard our employees, we have implemented a series of plans and initiatives at every level of the company, integrating technology as a key enabler to promote operational excellence and a proactive safety culture, especially in our transportation operations.

On the environmental front, one of our key priorities is reducing our carbon footprint. To that end, we are planning the installation of two high-efficiency vertical kilns in Chile, equipped with cutting-edge global technology. These kilns will be more energy-efficient and significantly reduce CO emissions, contributing to a lower environmental impact. This commitment is fully aligned with our sustainability agenda, which emphasizes responsible growth and respect for the environment and local communities.

What are the strategic goals and plans for Cbb Cales for the remainder of 2025 and the years ahead?
As mentioned, we plan to expand our production capacity in Antofagasta and Argentina by installing three new kilns in the coming years, aimed at meeting the growing demand from the lithium industry in both countries. We are also working to strengthen relationships with our clients. More than just a supplier, we strive to offer a personalized and innovative experience tailored to their specific needs. To stay close to our customers, we recently opened a modern distribution center in Pozo Almonte, which complements our existing facilities in Santiago, San Felipe and Antofagasta.

On the innovation front, we recently launched our fully automated mobile lime slurry plant at the Expomin trade show in Santiago, Chile. This solution ensures continued production during maintenance of fixed facilities and allows for increased output during periods of high demand.

Finally, we continue to enhance logistics safety. Cbb Cales supplies lime to over 60 locations and oversees more than 350 drivers operating 280 distribution trucks across various shifts. Ensuring the safety of our people throughout the supply chain, as well as maintaining reliable logistics to guarantee consistent material availability and uninterrupted service at all client sites, are key advantages we deliver as a company. ■

Fernando Miller

Head of Latam

FLEXCO

> We have an engineering team in Chile that works closely with our customers to develop bespoke solutions, which our factory in Chile can enable immediately, a capability unmatched by any competitor.

How important is mining and Chile for Flexco?
Mining represents well over 60% of our business in the region, and Chile is about 50% of our total regional revenue. It is from here that we coordinate the rest of our activities in the region, and where Flexco chose to build our first factory in Latin America. Our business has traditionally had a strong focus on the aftermarket, collaborating with key stakeholders such as Codelco. Our accessories line is the fastest growing, being suppliers to Codelco, BHP, Sierra Gorda and Anglo American, just to name a few. OEMs are also a rapidly growing business for us in Chile, working with important equipment builders such as FAM, TAKRAF, and TNT, among others.

What are the main challenges for the industry, and how are you facing them?
Among relevant challenges is a lack of qualified manpower. Productivity is one of the greatest challenges, as decreasing ore grades require transporting larger bulk faster. Not all companies have the expertise to tackle these challenges, but Flexco, being a global company with experience in all relevant jurisdictions, can offer solutions in this regard. This is a particularly serious challenge that can entail enhanced wear of materials.

How do your products contribute to safer mining operations?
First of all, we have a large staff of seasoned professionals who can advise on a wide range of matters related to conveyor belts and provide effective solutions to the challenges our customers face every day in their operations. Once the problem is identified, you need the right solutions to fix it most safely and effectively, and this is where our technology regarding designs, materials, or predictive detection comes in. We have an engineering team in Chile that works closely with our customers and distributors to develop bespoke solutions, which our factory in Chile can enable immediately, a capability unmatched by any competitor.

What new technologies are you incorporating into your products?
We are working towards enhancing the durability of our products while making them easier and safer to use, so that they can operate more autonomously, and maintenance can be done without stopping the conveyors. We were the first company in our sector to introduce technology to monitor and detect potential failures before they happen. Our devices use cloud applications for data collection and diagnostics concerning the equipment condition, which allows for more proactive and efficient maintenance.

How do you incorporate ESG concerns into your policies and products?
Our manufacturing processes are very sustainable thanks to cutting-edge machinery, and we generate very small amounts of waste, as we monitor for that. On the other hand, our products, including the Elevate technology, are designed to support and provide valuable insights to our customers to avoid spills and minimize the risk of fires, which are also vectors for significant environmental problems. Flexco has a long history of upholding the highest standards of values and building a strong culture.

What are the differences between operating in Chile regarding other jurisdictions?
Argentina, for example, has its unique political challenges. Brazil is huge, and they favor local production over foreign, also demanding more constant supervision of operations from suppliers. Peru has similar potential and challenges to Chile, but many of their sites are geographically remote, making it more difficult to engage and develop solutions for them. On the other hand, in Chile the industry is more formalized in general and keener on adopting new technology. Both the mindset and the equipment for mining in Chile, especially for copper, are world-class.

What are your plans for expansion?
OEMs are a sector in which we are very interested in keeping our focus. Last year, we duplicated our output by expanding the factory in Santiago; thus, we have the will and the possibility of growing aggressively. We have opened offices in Brazil and Peru with teams on the ground in both countries, as well as in Argentina. Those are important poles of growth for us, and we are investing. In Chile, we also have many opportunities to continue adding value for our customers. We continue to invest in personnel and technology to improve our processes, also to form a knowledge hub to use data from our machines to improve our customers´ operations. ■

Martin Brenner

Regional Managing Director Latam

WEIR

How is technology evolving in the mining industry and at Weir?
Our digital portfolio called 'NEXT' allows us to monitor wear life at spools, hoses, pumps, cyclones, mill liners, and in any wear component, which means that a customer can see what is happening inside the equipment, reducing downtime and improving safety. Mining in remote places, often with extreme weather, means that the industry is looking to have fewer personnel in the field. This then means that monitoring and diagnostic technology are becoming more important, as seen through the growing number of operations centers that are opening away from the mine site. Because of this trend, we are looking at digitizing all our equipment.

Can you identify some of the challenges Weir has faced in Chile and how you overcame them?
Maintaining people has been a real challenge and ensuring we have the right people in the right places has become increasingly difficult. Mining is not a glamorous industry, and you have to be ready on weekends and during vacations to serve the needs of your clients, which means not everyone is willing to commit to such jobs. Therefore, having people in your company passionate about mining is key.

For young people, the most important factors in choosing a career are growth and job security. You have to have a roadmap and a commitment towards young people from the company, so they know that they are going to develop. This helps people stay in the industry for longer. Having workers be able to identify with projects is also vital to retaining staff.

Conversely, Chile as a mining jurisdiction provides great security and the country has become more politically stable over the last few years. This has given our investors and clients peace of mind in the long term.

What is next for Weir in Chile in 2025?
Last year we rebranded, changing our image and incorporating our slogan 'Mining Technology for a Sustainable Future' as a front-facing part of our brand, which motivates us every day. For all the companies that form part of the Weir Group, we are 100% focused on mining and are passionate about what we do in the industry. ■

Christian Pastén

Regional Business Development Manager

GLENCORE TECHNOLOGY

Over the past 12 months, what have been the most significant milestones for Glencore Technology?
We have aimed to support mining operations that are facing difficulties in recovering minerals that are escaping through tailings, whether these be coarse, fine, or ultra-fine particles. In Latin America, the value we have delivered in the last year has been considerable. For example, we are recovering over 4% of ultra-fine particles from Fruta del Norte in Ecuador.

What sustainability and decarbonization initiatives are you implementing in Chile and Latin America?
One of our primary sustainability initiatives is the reduction of CO_2 emissions and energy consumption. We have developed the Jameson Concentrator, which integrates the Jameson Cell with the IsaMill. By combining both technologies, we can reduce CO_2 emissions by up to 140% and lower capital expenditures by up to 160% for both greenfield and brownfield projects. This makes the Jameson Concentrator a very competitive and successful solution today. We expect competitors to eventually follow suit and adopt similar strategies to achieve this level of efficiency.

What are the main challenges facing the deployment of your technologies in Latin America?
The main challenge we face is the issue of scale. Between Chile and Peru, approximately 9 million t/y of copper are produced, and mining companies there operate at very large processing capacities. As a result, the equipment must also be scaled up significantly. A second challenge lies with local manufacturing partners. We need more specialized suppliers, both in terms of materials and the actual production of equipment.

How is Glencore Technology supporting the reprocessing of old tailings?
Our technology is perfectly suited to treatment of tailings due to the small footprint, simplistic flowsheet and lower power requirement. Additionally it also produces a very high grade, washes out impurities and can recover both fine and coarse particles often unrecoverable in tank cell flotation technology. ■

Rodrigo Trevenzolli

South America Director

MARTIN ENGINEERING

Have you participated in any notable projects in Chile that could exemplify the work you do?
We are the main belt conveyor supplier in Chile, currently partnering on automation to optimize large-scale conveyor systems by reducing material spillage and airborne dust. We also successfully introduced our Cleanscrape and Orion Secondary cleaners, improving belts' lifespan and worksite safety.

How is Martin Engineering planning to introduce new technologies into its products?
From smart sensors embedded in our systems to remote monitoring capabilities, innovation drives how we deliver value to our customers. One of our key developments is a sealing system that increases belt lifespan by 25% to 30%, contributing directly to operational efficiency and sustainability. Additionally, we have introduced sensors that significantly reduce waste. Traditionally, our customers would change the belt's blades every two months, with our sensor technology providing accurate, real-time data on wear levels, replacement cycles have now been extended to up to four months — optimizing resources and reducing downtime. We are also integrating data analysis into our maintenance plans, allowing for predictive maintenance instead of a reactive approach — a true game changer for operational continuity.

How does Chile compare with other Latin American countries?
Chile is the world's largest copper producer, with a skilled workforce and world-class infrastructure. However, China, Peru, and Brazil are also rapidly expanding their copper capacities, so Chile must continue to prioritize stability, invest in innovation, and strengthen workforce development to maintain its privileged position.

What are Martin's plans for growing in Chile?
To grow in Chile, our strategy is focused on being closer to our customers — both physically and operationally. That means providing longer-lasting equipment, expanding our stock, and strengthening our field presence to anticipate customer needs and support them more proactively. ■

Eduardo Nilo

President South America

METSO

Can you provide an overview of Metso's performance and key developments in the past 12 months?
From our perspective in Chile and South America, we are witnessing potentially the most significant activity. Our entire organization is adapting to support this growth, which includes preparing for massive equipment purchases.

We have also been encouraged by developments in permitting and social agreements. The technological definitions appear appropriate for obtaining operational licenses for new mining operations and expansions.

What technological innovations has Metso been developing?
We have developed a new line of equipment that improves energy efficiency by at least 30% compared to previous technologies. A major milestone for us was the inauguration of our first large-scale recycling plant for mill linings in Chile. This facility can separate and recycle steel and rubber components, addressing sustainability challenges in mining equipment.

Each of our technologies now includes advanced connectivity, allowing for comprehensive data analytics, optimization, and remote monitoring.

How is Metso addressing the challenges of declining mineral grades?
Our technological solutions now enable the economic processing of minerals with lower grades. In the comminution process, we have developed technologies that can handle these challenging mineral compositions efficiently. We are also exploring advanced filtration technologies, such as economic tailings filtration, which allows for water optimization and more sustainable processing methods.

How does Metso view Chile's role in the global mining landscape?
Chile has maintained its mining leadership for decades, and we believe it will continue to do so. However, our perspective is broader and more collaborative. We are equally excited about the potential of other countries like Argentina, which could become significant mining actors in the future. Chile's leadership extends beyond production volume. We see three key areas of leadership: production capacity, mining knowledge, and human capital. ■

Enrique Vargas

Country Manager Chile, Peru
MAGOTTEAUX

Can you introduce Magotteaux and your work in the Chilean mining Industry?
We are the only supplier to offer a full range of grinding media as well as ceramic grinding beads, ideal for dry grinding in mining among other applications. In addition, we also provide technological services aimed at generating value in the milling processes of our customers.

What recent developments help reduce lost time and improve efficiency?
Magotteaux pioneered the use of high chromium alloys in grinding media as well as composite materials in the manufacturing of high value adding products to improve efficiency and mineral recovery with a lower carbon footprint. We have several large customers using this product worldwide and we are currently in trial tests with clients in Chile. We recently signed the first contract for grinding balls that incorporates a 100% supply model from recovered material with Codelco, implementing a circular economy model in the supply of grinding balls.

Our goal is to strengthen our regional footprint as a leader in process optimization products and services for abrasive and impact applications.

What is next for Magotteaux in 2025?
At a local level, our goal is to strengthen our regional footprint as a leader in process optimization products and services for abrasive and impact applications by combining innovative solutions with dedicated service, addressing the challenge of growth and customer satisfaction across Chile and Peru. Based on the above, we are focused on developing new added-value solutions aligned with our customer needs, emphasizing not just product supply but also providing value through technical service support and close customer relationships. Innovation and technology have historically been a focal point of our culture and one of the essential elements that sustain our differentiation strategy. Another important focus already underway is increased production of grinding media capacity to support the continuous growth of our clients in the region. ■

José Pablo Domínguez

General Manager,
ME ELECMETAL

Could you provide a summary of ME Elecmetal's key milestones and achievements in 2024?
We completed two important acquisitions: one in Peru, where we purchased a plant to strengthen our presence in a key mining region. The second acquisition was in South Africa, where we acquired the assets and capabilities of Prima, a respected industry player. Additionally, we expanded our sustainability efforts by securing a CORFO subsidy to develop a solution for recycling grinding balls and recovering environmental liabilities in mining.

How has the implementation of QuickScan technology impacted mining operations in Chile?
It allows for fast, detailed image capture and processing, providing insights that improve decision-making in mining operations. This tool supports our broader strategy of providing comprehensive, integrated solutions rather than isolated products.

What role do remanufactured parts play in your sustainability strategy?
We focus on reducing the mining industry's carbon footprint by offering solutions that allow companies to repair components rather than purchase new ones when it's more environmentally sustainable. Additionally, we actively recycle products that have completed their life cycle, recovering valuable materials to reintroduce them into production. This approach supports a circular economy, where we work closely with mining companies to help them track and reduce their carbon footprint, contributing to their overall sustainability goals.

How have the digital solutions developed by ME Digital Lab been integrated into mining operations in Chile?
The ME Digital Lab has been instrumental in developing cutting-edge digital solutions tailored for the mining industry. Two key solutions have had a significant impact: the digital twin and the Impact Finder. The digital twin technology has been deployed in major mining companies to help them understand and predict process behaviors, as well as serve as a training tool for operators. The Impact Finder, on the other hand, helps control critical impacts in SAG mills and improves mineral processing efficiency by optimizing grinding operations. ■

Collaboration for a Technological Future

Engineering firms look to cement their place in the mining boom

Landmark collaborations in the industry at the beginning of 2025 are not limited to major mining companies like BHP and Codelco. Mining is an industry rich in data and technology, and AI and machine learning have the opportunity to harness this data and utilize it for the betterment of everyone. Tech companies are offering solutions that allow mining companies access to data and make this available across equipment manufacturers and suppliers.

From new technology to new facilities
Seequent, the company that created Leapfrog Geo, launched its Evo platform in 2024, which aims to standardize disparate data sources by creating its own ecosystem. The platform uses open-source coding to allow community development and further collaboration between the mining industry. "This collaboration needs to encompass mining companies, technology providers, OEMs, and governments to accelerate regulation and offer visibility to various mining stakeholders regarding the potential of mining projects," said Ignacio Torresi, executive vice president, Latin America, Seequent.

Other companies are also capitalizing on the opportunity that dispersed data constitutes. Thus, using digital twins and data analytics to optimize short-term planning, operational control and decision making, TIMining is noticing the impact of data silos and the lack of past collaboration in the mining tech space. "Data silos represent a significant challenge in the mining industry. We specialize in capturing and interpreting the dynamic geological landscape, tracking rock extraction and mine geometry evolution. This ability to collect and interpret complex geometric data is a capability that most large software suites struggle to accomplish," noted Phillip Whatmore, CEO of the start-up.

Likewise, Elio Céspedes, general manager of Latin America at Datamine, declared: "The next five years are going to be the years of integrating and consolidating data quality. It is pointless to use AI without verifying the reliability of its underlying data. Integration will also be key, with many key players accepting the need to cooperate with the rest. Databases are getting standardized so that products and systems can be integrated, regardless of their manufacturer. We are also working in that direction."

ABB witnessed notable growth in automation and digitalization over the past 12 months. The company joined forces with EPIROC to support decarbonization efforts in mining technologies. "I think it is important that when challenges arise, we work together as an industry to find the best technical or economic solution. Whether it is an OEM product, an electrical product, or something else, automation and digitization should be linked not only to provide greater synergy within a project but also to monitor how an asset operates over time," highlighted Jorge Abraham, local division manager, process industries for ABB's office in Santiago.

Technology company Veracio witnessed a change in attitude towards technology in 2024, transitioning from curiosity to implementation. The company signed a strategic partnership with Bureau Veritas with projects at Codelco's Ministro Hales mine. "By integrating Veracio's technology into Bureau Veritas' existing services, mining companies can more readily adopt our solutions, benefiting from Bureau Veritas' industry credibility. This collaboration has the potential to drive faster and more widespread adoption of our technology in the mining sector," said Eduardo Molina, vice president, commercial, Latin America for Veracio.

Concerning innovation related to mining processes, Ceibo's technology allows for the profitable extraction of ores that would be otherwise unfeasible. "Being able to leach sulfides that are below oxides, especially those that are deeper, presents enormous value to society and mining companies. More mining companies are looking to explore medium-sized assets, even large mining companies are now looking to own multiple smaller assets, as these can be easier to develop and operate," elaborated Cristóbal Undurraga, co-founder and CEO of Ceibo. The company is representative of a larger trend consisting of the exploitation of formerly idle ores or even waste materials through cutting-edge technology, allowed by rising metal prices. The company announced in 2024 a partnership with Glencore at Lomas Bayas, and has harvested their first cathodes at their San Gerónimo demonstration plant.

Image courtesy of Epicor

Fraternity, acquisitions, and integration

2024 has been a busy year for BOSCH Rexroth in Chile, enjoying a growth rate of 30% within the mining sector, providing sensors and control systems that allow enhanced sustainability and efficiency. They have also been proactive in searching for collaboration opportunities with other companies to expand their portfolio. "In Rexroth we are exploring hydrogen technologies in collaboration with partners in Africa and the US. Looking at Chile, our ambition is expanding our overhaul and supply of planetary units, developing new power electric solutions with CtrlX, Hägglunds CBm, QMX and Thunder for heavy duty and 100% variable speed applications," Marcelo Celis, general manager at BOSCH and Bosch Rexroth, declared.

Cooperating with IT companies is also a rising trend, as Phoenix Contact, a company specialized in automation systems, demonstrates. Cristian Jacobsen, general manager and legal representative of Chile operations for the company, stated: "Phoenix Contact also has energy monitoring and management systems, and we are cooperating with Amazon Web Services and Microsoft to allow programmers to profit from our open software platform to create their own monitoring systems. Through Amazon Web Services, we are now screening all the energy consumption of a mining and a solar power plant."

This underpins the huge potential regarding collaboration with tech giants, but also in open-source solutions, allowing everyone to play a part in the process of devising a brighter, more efficient future. The company has tripled its size in the last five years, signifying that this is an avenue for growth.

The case of SK Godelius is a model of how these synergies can also be built through acquisitions rather than partnerships. "Part of the advantage that we believe SK Godelius brings to the industry has to do with the Sigdo Koppers group, which has a very deep presence in various stages of the mining value chain, whether in grinding through Magotteaux, in blasting through ENAEX, or in construction through SKIC, also in logistics and services. This, combined with a technology-intensive company like SK Godelius, makes an extraordinarily valuable combination," as Fernando Bracco, founder and CEO, explained.

Moreover, the company is also working hand-in-hand with NASA and other companies of the Americas towards making lunar mining possible.

In the same vein, Hexagon has been busy acquiring companies whose expertise could complement their products. "Hexagon has acquired several companies not just to sell their products, but to enhance our own technologies through synergy. A good example is our anti-collision systems. Thanks to new sensors from the acquired company Indurad, we are able to automatically stop machines in the event of a collision risk situation. It is not just about integration but improving our technologies through collaboration. Internal teams work together on these enhancements, creating more value and usability for mining operations," Norma Vargas, general manager of Chile, explained.

The company is investing heavily in products for underground mining, preparing for the anticipated expansion of this mining modality.

The former hints at the possibility that collaboration opportunities are not necessarily limited to private companies, but that there is also immense potential in building bridges with academic and scientific institutions. In this sense, LithoDat, an Australian spatial exploration and data services company, boasts broad agreements with leading academic institutions. Fabian Kohlmann, the company's managing director, elaborated: "We arranged collaboration agreements with academia by which the IP of what is created rests in our possession. For example, they collaborated with us on paleogeographic reconstructions, enabling users to see where their deposits were located 21 million years ago. This is of great importance both for exploration and geology. We also created EarthBank, a platform where labs and universities can publish their data, which turns us into a publisher, as we can mint DOIs, making their knowledge more accessible and also allowing for its commercialization."

Image courtesy of Caserones

Rodrigo González Guerra
Founder and CEO
MINVERSO

> Minverso enhances safety and operational efficiency through immersive virtual training, enabling better performance from the operators. By allowing workers to engage in simulated, immersive, and realistic mining environments, the likelihood of accidents and procedural errors is reduced.

More companies are taking on this path. Endress+Hauser is a global leader in process optimization, instrumentation and measurement in the mining industry. The company is looking to construct a Customer Experience Center, where clients and universities will be able to test and evaluate new technologies. As well as this inter-company collaboration, Endress+Hauser is optimistic about the future of collaboration between countries in Latin America that will bolster technological adoption. "I think the best thing for mining in Chile is the growth of the industry in other Latin American countries like Ecuador and Argentina because it presents a new opportunity to expand for many Chilean companies," said David Alaluf, general manager of Chile's Endress+Hauser office.

WEG, a Brazilian engine manufacturer, also sees cooperation as the way to the future. Boris Urquijo, commercial manager at the firm, declared: "Our direction is clear; we aim to offer broader, integrated solutions by forming strategic collaborations and expanding our offering through innovation. We believe that by staying at the forefront of efficiency, electrification and sustainability we will continue to be a trusted partner for the mining industry in Chile and globally."

Additionally, the company is also a provider for another rising trend in the mining industry. "We offer Battery Energy Storage Systems (BESS) that can provide energy backup during outages or fluctuations. They help mines stabilize their operations during disturbances and improve grid independence. Demand for BESS is increasing from mining companies, especially given Chile's grid challenges," Cristian Reinoso, Motion Drive manager, added.

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> A new generation of professionals is driving change, challenging traditional practices and seeking smarter, more efficient approaches.

Jorge Abraham

Local Division Manager, Process Industries

ABB

What were some of ABB's key achievements and milestones over the past year?
ABB has strengthened its footprint in the Chilean mining sector through technological solutions aimed at digitalization, operational efficiency and sustainability. These efforts have reinforced our role as a strategic partner in the industry's energy transition.

One major highlight was the signing of a contract with a leading mining company for the implementation of an eTrolley system for haul trucks, an initiative that will significantly reduce greenhouse gas emissions. We hope this sets a precedent for other mining companies to follow in their decarbonization efforts. The eTrolley technology, already deployed in Sweden and Canada, is currently undergoing pilot testing with several of our Chilean clients.

How does ABB tailor its solutions to meet the needs of Chilean mining companies?
Chile's complex geography and the wide variation in mine locations, some situated over 3,000 m above sea level, others deep underground, require highly adaptable engineering solutions. Our team is equipped to work in these extreme conditions, delivering solutions for both high-altitude and deep underground environments.

In addition, ABB has developed advanced ventilation solutions using ventilation on demand software to optimize energy use. We have also implemented the world's largest underground conveyor belt system, showcasing our ability to deliver world-class solutions tailored to local challenges.

How can mining companies use collaboration to overcome current industry challenges?
Collaboration is essential when facing industry-wide challenges. Whether it involves OEM products, electrical systems, or other technologies, automation, electrification and digitalization should be integrated to create synergies and long-term value.

It is crucial to go beyond the upfront investment and focus on long-term performance. Designing a system quickly to save costs can result in higher maintenance and operational issues down the line. Long-term partnerships between clients and suppliers are key to ensuring equipment and solutions that can last for decades.

We have seen excellent examples of collaboration, such as the joint efforts between Epiroc and ABB to develop decarbonization solutions. Involving universities is also vital, as their research often leads to innovative ideas that can be applied in real-world scenarios by suppliers.

How does technology adoption in Chilean mining compare to other industries?
In recent years, Chile's mining industry has significantly accelerated its adoption of technology. A new generation of professionals is driving change, challenging traditional practices and seeking smarter, more efficient approaches.

Technology itself is evolving rapidly, and companies that fail to innovate risk falling behind much more quickly than in the past. Countries like Argentina and Ecuador, whose mining sectors are newer, have the advantage of integrating advanced technologies from the start. Chile, therefore, must continue to leverage its experience and innovation to maintain leadership in copper mining.

What initiatives does ABB use to attract and retain talent in Chile's competitive labor market?
We are committed to empowering our people and helping them grow. One successful initiative has been a university partnership program where students work with ABB for a full year. This long-term experience is far more valuable than a short internship and provides ABB with trained talent who already understand our systems and culture. Many of these students are later hired into permanent roles.

We also promote internal mobility, allowing employees to move between offices and sectors. This not only fosters professional growth but also enables our talent to work on global projects.

What are ABB's current research and development priorities?
Digitalization is a major focus area, particularly its role in decarbonization across ABB's value chain. In line with our sustainability goals, we are actively working on reducing and reusing waste, such as developing recyclable packaging solutions for our products.

What are ABB's goals and growth plans in Chile for 2025?
Our 2025 strategy is centered on sustainability, in alignment with ABB's global carbon reduction targets. We aim to promote clean technologies and energy-efficient solutions throughout the mining sector.

A key focus is educating our clients about the latest technological advancements and identifying the most suitable ABB solutions for their operations. Our goal is to offer fully integrated systems to electrify mines (eMine) and significantly reduce CO2 emissions, such as the ongoing implementation of eTrolley solutions. ■

Ignacio Torresi

Executive Vice President, Latin America

SEEQUENT

What have been the recent developments from Seequent?
Our biggest highlight is the introduction of Seequent Evo, a complete platform as a service with a full ecosystem including a developer portal, APIs, and a family of web applications that are interconnected to our desktop applications.

One of the most important aspects of Evo is addressing the scattered and siloed nature of different types of files and data sources in mining. Everything that is put into Evo gets standardized in a way that is completely transversal and can be used by our applications, third-party applications, or partner applications. Additionally, Evo's codebase is open source, with developer toolkits, open APIs, and reference implementations. This allows the development community to use it to develop their applications.

How do you see data-sharing applications applying across mining, and is collaboration the way forward?
We are witnessing increased collaboration in the mining industry, exemplified by significant joint ventures such as Andina and Los Bronces, as well as Lundin and BHP in Argentina with Filo del Sol. We exist in a world characterized by the proliferation of mining technology and the heightened strategic importance of mining, driven by critical minerals, rare earth elements, and ongoing geopolitical shifts, all while we strive to decarbonize and electrify. Discovering new deposits that can be developed by a single organization is becoming increasingly challenging, making collaboration essential. This collaboration needs to encompass mining companies, technology providers, OEMs, and governments to accelerate regulation and offer visibility to various mining stakeholders regarding the potential of mining projects.

What is next for Seequent in 2025?
We are actively building regional teams that will be 100% focused on selling and supporting our technology. Finally, we will leverage these strategic pillars to reinvest part of that into Evo, exposing our most trusted and long-standing mining clients to this platform to gather feedback for continued development. ■

Fabian Kohlmann

Managing Director

LITHODAT

Could you introduce us to LithoDat?
We are a spatial exploration and data services company founded in 2018 in Australia. We extract publicly available data from publications, reports, and other sources and standardize it, making it more usable for our clients and sparing them a lot of work.

How can you contribute to cost-efficient and more productive mining exploration?
For greenfield projects, the first step is normally sending exploration teams to look for suitable areas and gather information about them as quickly as possible, which is an expensive process. We spare them many of those efforts, providing them insights as to what data available is in the area, the geochemistry and the kind of rocks, or when mineralization happened, all through our platform.

What can Chile do to promote more greenfield investment?
The government should make it easier for foreign companies to deal with bureaucratic procedures. As a data company, we think that making information readily available is something that can attract investment and reduce uncertainty.

How does your partnership with universities help enhance your technology?
It represents a massive help when it comes to R&D. We arranged collaboration agreements with academia by which the IP of what is created rests in our possession. For example, they collaborated with us on paleogeographic reconstructions, enabling users to see where their deposits were located 21 million years ago. This helps to better understand the geological context and the processes, such as tectonics or hydrothermal activity, that may have contributed to mineralization at that time. This is of great importance both for exploration and geology. We also created EarthBank, a platform where labs and universities can publish their data, which turns us into a publisher, as we can mint DOIs, making their knowledge more accessible and also allowing for its commercialization. ■

Norma Vargas

General Manager

HEXAGON CHILE

How does Hexagon's integrated platform improve mining efficiency?
We aim to centralize data from all systems on a single platform, enabling integrated management. We are working on lighter cabin designs, with fewer screens, fewer cables, fewer points of failure, which facilitates maintenance, and the costs associated with this and implementation. Hexagon's solutions are across the entire mining value chain, from geology, planning, extraction, maintenance and safety, adding value to each of them, but working in an integrated way.

How does the shift to underground mining and the projected US$83 billion investment in Chile present opportunities for Hexagon?
There is no mining of the future without technology. The only way to develop efficient, safe projects is through the application of technology that adds value to operations. We are already working on expanding our product portfolio not only for open pit mines but also for underground through automation, teleoperation, fleet systems, anti-collision, anti-fatigue, analytics and AI, all to improve safety and optimize resource by removing people from risky areas and using agnostic technologies that allow the operation of systems from different suppliers in an integrated system.

How does Hexagon address the challenge of high upfront investment in mining technology?
Hexagon is fully OEM agnostic. We can retrofit any mining equipment, regardless of brand, age, or type. This reduces capital expenditure because we do not need new specialized machines. Regarding operational expenditure, autonomous or semi-autonomous mines require fewer personnel and are more predictable, improving equipment utilization and life.

What are Hexagon's future plans?
We want to be strategic partners of the different mining companies, results-oriented, with a superior portfolio and a commitment to innovation and digital solutions, always sharing the core value of safety. Working on intelligent digitalization, to make operations more competitive, efficient and safe, with non-negotiable respect for the environment and people. ■

David Henderson

Chief Growth Officer, Americas

FLEET SPACE TECHNOLOGIES

What does Fleet Space Technologies do, and how does your platform work?
Fleet Space Technologies (Fleet Space) is an Australian company that combines space and mineral exploration. We design and build sensors that connect directly to our low-Earth orbit satellite network. These sensors are deployed in the field and send data directly to our cloud-based Exosphere platform, which uses AI to process and analyze multi-physics data. Our goal is to help exploration companies reduce uncertainty in subsurface targeting, improve discovery timelines, and reduce environmental impact.

What is your current footprint and activity in Chile?
Chile is a new but rapidly growing market for Fleet Space. We are currently active in the country through a project we are executing with Gold Fields at Salares Norte. Our system has been particularly valuable in Chile due to the high-altitude terrain and limited access to certain exploration zones. Our sensors do not require road access or large logistics footprints, enabling us to deploy them in areas that would otherwise be inaccessible.

How do you address long-standing issues of data fragmentation in exploration?
Many companies have legacy datasets in different formats, and sometimes even in paper form, as we have seen with mining operations that are multi-decades old. Our platform allows clients to consolidate these datasets, whether historical or new, and derive value from them using modern AI tools.

What does the acquisition of HiSeis bring to Fleet Space?
HiSeis has developed advanced active seismic technologies for collecting and analyzing seismic data. When integrated into Exosphere, their seismic imaging capabilities allow us to deliver even more detailed and accurate subsurface models. This is part of our broader strategy to offer a comprehensive multi-physics solution. We are now combining data from electromagnetics, gravity, magnetics, seismic, and more—applying AI to bring it all together in one system that can reduce uncertainty and increase the success rate of drilling programs. ■

Orlando Lara

Regional Segment Leader Mining Minerals and Metals

SCHNEIDER ELECTRIC

How is Schneider Electric approaching technological adoption in mining?
The industry is increasingly embracing advanced analytics, predictive technologies, cloud management, and cybersecurity. We view data as a critical asset that must be analyzed to enable better decision-making in operational, process, and optimization contexts. Our approach focuses on providing agnostic solutions that allow mining companies to integrate new technologies without completely replacing their existing infrastructure. We develop technologies that can unite different brands and systems, which is particularly attractive to clients who want to incrementally improve their existing setups.

Large mining companies in Chile are making significant investments in digital transformation and sustainability. These investments demonstrate a strong commitment to technological innovation and efficiency improvements.

What are Schneider Electric's objectives for 2025 and beyond?
Our primary objectives include participating in the early stages of capital expenditure projects across South America, particularly in Chile, Peru, and emerging markets like Argentina. We aim to collaborate closely with engineering firms during project feasibility stages, presenting our solutions and demonstrating how we can add value. ■

Marcelo Celis

General Manager

BOSCH AND BOSCH REXROTH

What were BOSCH and Bosch Rexroth's most significant achievements in the Chilean mining industry in 2024?
We proactively continue our modernization campaign of Marathon Hägglunds Direct drives that integrate the newest Compact CBm motor that could reach beyond 2 million Nm torque and DU-c hydraulic units with the latest technological innovations. Second, our Rexroth service workshop located in Antofagasta underwent a thorough audit by the most important mining companies and was subsequently certified for hydraulic repair needs. Third, we noted a significant customer´s interest of Smart Sensor technologies, that are crucial for tracking and trend of a long-term of belt conveyors idlers, avoiding unexpected failures.

How is BOSCH Rexroth collaborating with other companies, and what are its plans for 2025?
In Rexroth we are exploring hydrogen technologies in collaboration with partners in Africa and the United States; this new fueling station, stacker and water treatment are being presented in Hannover fairs. In BOSCH mining our plan is scaling-up the use of our smart sensor technologies even increasing our further portfolio (to the highest sophisticated sensors). Industrial boiler Bosch technology will be incorporated to mining applications for heating water in lithium and in solvent extraction, coming soon. Finally, we continue strengthening our Official Rexroth Partners and Integrators network. ■

Elio Céspedes

General Manager Latin America

DATAMINE

How does integration of services throughout the whole mine's life contribute to more efficient and sustainable operations?
Mining relies on data, which is then modelled. Thanks to our software, clients can then start planning how to mine the deposits, supporting them throughout the entire process. Technology identifies areas where efficiency can be improved.

Regarding sustainability, we offer a comprehensive range of products. One of them is a Chilean innovation that we acquired, called Zight, which manages health and safety, licensing, and general sustainability records. Chile is a jurisdiction where these issues are strictly audited.

Do you think Chile's mining sector is reluctant regarding new technologies?
It depends on the size of the company. Larger ones are more interested in new technologies, medium ones on standardizing processes and databases, while the smaller ones are more focused on optimizing capital. Many Chilean miners, for example, are pushing towards agnostic solutions because they want their machinery to be interoperable. This signifies that the Chilean market is demanding and eager to adopt new technologies. ■

Demonstrating Mining Cares

"The benefits of mining reach every walk of life, with hospitals, schools, and roads built because of mining. Mining is an engine of development for Chile."

David Alaluf, General Manager Chile, **ENDRESS+HAUSER**

"Our geotechnical products contribute significantly to safety by identifying potential rock instability risks that could endanger employees."

PHILLIP WHATMORE, CEO, **TI MINING**

"We cooperated with the government in the generation of electromobility standards, being at the forefront of this trend that will be fundamental to automating mines."

Cristian Jacobsen, General Manager and Legal Representative Chile Operations, **PHOENIX CONTACT**

"Robots' footprints are immensely smaller than those of a large truck, and they typically run on electric energy. In the robotized underground mining scenario, the robot's impact on the environment is much smaller."

Fernando Bracco, Founder and CEO, **SK GODELIUS**

"Our predictive maintenance components anticipate failures and help minimize human presence in hazardous environments, enhancing safety. We also focus on reducing energy losses, contributing to long-term sustainability and lowering environmental impact."

Patricio Cabezas Bell, Country Manager Chile and Peru, **FESTO**

"As a country, we need to embrace that mining and the environment must coexist, and permits are necessary to ensure this relationship functions properly."

Cristóbal Undurraga, Co-Founder and CEO, **CEIBO**

"Our solutions can identify and separate contaminated material before processing, preventing the inclusion of harmful substances. By enabling immediate corrective actions, our technology helps mining companies minimize their footprint and improve sustainability."

Eduardo Molina, Vice President, Commercial, Latin America, **VERACIO**

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On the potential of collaboration through accessing third-party data, Fleet Space Technologies, a space and mineral exploration company, is a seasoned actor. David Henderson, chief growth officer for the Americas, said: "We consider ourselves a multi-physics platform. This means we can ingest data from various sources—drone surveys, satellite imagery, core scanning, lab assays—and combine it with data from our sensors. All of this is processed through Exosphere, where artificial intelligence is used to synthesize, interpret and model the subsurface in real time."

Closely related is the adoption of agnostic solutions. "The industry is increasingly embracing advanced analytics, predictive technologies, cloud management, and cybersecurity. We view data as a critical asset that must be analyzed to enable better decision-making in operational, process, and optimization contexts. Our approach focuses on providing agnostic solutions that allow mining companies to integrate new technologies without completely replacing their existing infrastructure. We develop technologies that can unite different brands and systems, which is particularly attractive to clients who want to incrementally improve their existing setups," declared Orlando Lara, regional segment leader for mining minerals and metals at Schneider Electric.

Exploring the prospect of combining VR and AI is Chilean company Minverso. "We see immersive technology as a new interface layer for accessing and understanding operational data. AI already plays a critical role in optimizing industrial processes, and IoT provides vast streams of sensor-based data. However, interpreting that information often relies on complex engineering diagrams or dashboards that are inaccessible to most non-specialists. Our goal is to democratize data interpretation through intuitive and interactive visual interfaces, enabling broader collaboration and faster decision-making, breaking down geographic barriers, and allowing stakeholders from anywhere in the world to view and analyze data in real time," affirmed Raúl González Guerra, founder and CEO of Minverso.

With this potential, the company, already established in several of the most important mining jurisdictions worldwide, wants to become a key player in mining innovation globally.

Collaborations like this have the potential to help more technologies reach a wider variety of mines. Combined with Chile's world-renowned expertise in mining and environmental management, equipment and technology companies are set to work together to improve the future of mining and work towards a net-zero industry in a scenario that many companies point to as being at the technological cutting edge, and a playground for innovation and testing. Patricio Cabezas Bell, country sales manager Chile and Peru of the century-old company Festo, stated: "Chile has become a development platform for mining innovation. What once required manual work is now automated, often remotely. Private investment has been key to this transformation." ■

Paulo Aguilera

General Manager Latam

GROUND PROBE

Can you introduce us to GroundProbe and provide us with a summary of the last two years?

GroundProbe manufactures geotechnical monitoring sensors, chiefly radars for tracking slope stability. Beyond that, we also offer onsite and remote monitoring services through our three operations centers around the globe, one of which is in Santiago. These radars are used to monitor the movement of masses of rock and mining slopes. In both sectors, they represent some of the most critical equipment for ensuring safety. Many operations would not operate without our radar systems in place, as the risk of missing an impending collapse would be too high.

We have two factories, one in Australia and the other in the US, which allows us to deliver our products promptly to our market in the Americas. GroundProbe has a huge market share both globally but also in Chile, because we invented these radars. Since Chile has been keener on adopting new technologies, particularly regarding safety, than its regional counterparts and is a mining powerhouse, it constitutes a very important market for us regionally.

How do your products contribute to safer mines?

Our radars monitor the deformation mine walls, which can collapse because of the mining operations. There are two very emblematic cases where our radars made the difference, Bingham Canyon in the US and Ministro Hales in Chile. Both situations were recognized well in advance by our radars, which detected subtle precursor deformations and predicted when the collapse would take place. Thanks to that information, both mines were successfully evacuated. For this reason, all large mining companies require to have these products in their operations. Moreover, we have our Careplan, which offers maintenance services, as safety equipment should always be functional. Finally, we also have our monitoring service, with our staff constantly screening the mines in real time. ■

SERVICES

“Mining companies can no longer rely solely on salaries to attract young talent; they must also provide a better living experience, and we are committed to supporting them in this effort.”

Cristóbal Schneider
CEO
PROMET

GBR Series • CHILE MINING 2025

Image courtesy of Promet

Safety First, Ask Questions Later

The measures that drilling and blasting companies are taking to make mining safe

Drilling and blasting have long been associated with danger, and this must change if the mining industry is to avoid lost time and fatal accidents that have harmed its image. Safety is now paramount to the operating model of drillers and blasters, setting the example for other sectors of the mining industry.

MBI Global offers both drill machines and consumables to miners. "We prioritize health and safety, which are foundational elements of sustainable mining. Furthermore, we spend significant time in the field gathering insights that feed back into product development," explained Mario Rouillier, MBI Global's president.

"Chile has some of the most stringent regulations globally. MBI Global embraces this challenge, ensuring our products exceed local standards by incorporating advanced safety features such as remote operation, area restriction sensors, and user-friendly control panels," elaborated Marco Quevedo, regional territory manager, MBI Global.

General manager of blasting technology company Orica, Mark de Castro, believes safety concerns encourage faster technological adoption in mining. "Chile is at the forefront of mining technology adoption in Latin America, driven by several factors. These factors make advanced digital and automation solutions essential for cost reduction and efficiency. Among Orica's regional markets, Chile has the highest growth and implementation rates for new technologies," he said.

Orica has introduced WebGen wireless detonators, which as mines go deeper will be crucial to enhancing safety. "WebGen eliminates the need for surface wires, enhancing safety and flexibility while increasing productivity by up to 20%, reducing dilution by 10-15%, and improving stop cycle times by 30%," continued de Castro.

Acquired by Orica about six years ago, GroundProbe manufactures geotechnical monitoring sensors used to track slope stability. "Chile, being a seismic country, poses additional challenges when mining, particularly if underground. This is because the pressures the mine has to endure are higher, and with Chilean mines being generally deep, it makes safety all the more important," emphasized Paulo Aguilera, general manager Chile, GroundProbe.

ENAEX also serves the drilling and blasting sectors, producing low-carbon products and green ammonia. "We are particularly addressing the critical issue of rock bursts in underground mining, which pose significant safety risks. Our goal is to eliminate human exposure during blasting operations. The UG-iTruck represents a breakthrough in this area, potentially revolutionizing safety protocols in underground mining environments," explained Pablo Wallach Beovic, VP of innovation and marketing.

However, more can be done in Chile to ensure technologies are being introduced to improve safety. Wallach Beovic continued: "Chile presents regulatory challenges. Obtaining permits for technological trials, even for safety-improving robotics, can involve lengthy bureaucratic processes."

Similar problems have been cited as hindrances by other executives in the drilling and blasting space. Tomas Butazzoni, former general manager of Technosteel highlighted: "Chile has made major advances in sustainability, emissions reduction, tailings management and safety. Yet there is still a perception gap among some government agencies and segments of the public who believe that mining companies are not fully committed to these issues. This lack of trust creates a very complex permitting landscape."

Over the past 18 months, Technosteel has diversified into rotary, reverse circulation, and water well drilling, alongside its original focus on diamond drilling.

Orbit Garant operates in both Chile and Canada and signed 2024 contracts with El Abra and Anglo American, enabling long-term planning and targeting a multipurpose drill on-site by Q4 2025.

Similar to Wallach Beovic and Butazzoni, Christian Barra Llano, general manager of Orbit Garant in Chile, believes that Chile's safety standards can be restrictive concerning drilling and blasting. He commented: "The labor, safety and health regulations are completely different to Canada, with much more structure and much stricter laws in Chile than most other countries. In Canada, there is much more flexibility on what is allowed between a client and service provider, granting more freedom to companies to be able to deal with each mine's unique needs. This is what is lacking in Chile in my opinion."

Despite these hurdles however, the company is looking to introduce new technologies and equipment with the goal of improving safety, inclusivity and efficiency in their operations. "At El Teniente we are currently trialing an upgraded drill to improve capacity, performance and semi-autonomy. Currently, we are working on developing a robotic arm that allows an operator to manipulate the drill more easily," said Barra Llano.

Exploration Drill Masters, a Santiago-based drilling equipment manufacturer, prioritizes flexibility, recognizing that safety must be adapted to each project's unique challenges. "We collaborate closely with users to co-engineer and tailor products and solutions for their specific needs. This level of flexibility and collaboration means we develop relationships of trust and mutual partnership, which is much more valuable than a traditional supplier-customer relationship," revealed Quentin Dulake, Exploration Drill Master's global sales executive.

The company's focus on product development and hands-free drilling solutions has naturally led it to consider safety foremost in the design and manufacture of its products. "The transition over to ultra-safe hands-free drilling is an opportunity and an area where we excel. The safety standards in Chile are some of the toughest in the world, so having the ability to meet them while maintaining good drilling productivity is crucial," commented Nigel Smith, general manager, Exploration Drill Masters.

The drilling and blasting sectors are moving together towards a safer future for its workers and mining more generally. Harnessing technology and placing health and safety at the heart of R&D will only yield positive results, with autonomous drilling a recent step to bringing workers out of the line of fire. However, despite obvious willingness from the industry itself, politics and bureaucracy are impeding progress. If mining is to gain notoriety in the wider public eye as an industry with a tremendous safety record, something which would benefit all of Chile, then governments and politicians must clear up regulatory uncertainty and put their trust in the innovation and dedication of drilling and blasting companies. ■

Mark de Castro
General Manager
Chile and Argentina
ORICA

"The increasing shift toward underground mining will be a major driver for drilling and blasting companies. As mines go deeper, solutions like WebGen wireless detonators will be crucial in enhancing safety and productivity."

Tomás Butazzoni
General Manager
CHRISTENSEN BOYLES

"The mining sector is currently experiencing renewed investment activity. However, not all companies are moving at the same pace. Some remain cautious due to the complexities of the regulatory environment."

Image courtesy of Komatsu

MR

MQ

Mario Rouillier and Marco Quevedo

MR: President
MQ: Regional Territory Manager
MBI GLOBAL

Can you provide a general overview of MBI Global?
MR: MBI Global is a company with a strong legacy in the drilling industry, tracing back approximately 35 years. Four years ago, I led the acquisition of MBI to build a more robust, comprehensive, and vertically integrated company. The idea was to not only offer machines but also consumables such as rods, bits and accessories, which allow us to remain engaged with customers consistently. We now operate with 15 distributors worldwide and have offices and manufacturing operations in Peru, Mexico, Val-d'Or and Saskatoon, covering five continents between our office and distribution network.

How has MBI Global's presence evolved in Chile in recent years?
MQ: MBI Global has maintained a solid presence in Chile for over a decade. Our initial strategy was to introduce high-quality Canadian products to a market that is deeply connected to the mining industry. Over time, we have steadily increased our market share, and today we are widely recognized throughout the sector.

Has the recent decline in greenfield investments affected MBI Global's strategy in Chile?
MQ: The slowdown in greenfield investments is indeed a concern. Delays in permitting and bureaucratic hurdles have limited growth in some areas. Nevertheless, we continue to evolve by focusing on agility and resilience. The market is dynamic, and every year brings new challenges. Our approach is to reposition ourselves as strategic partners, not just suppliers.

What is MBI doing to incorporate automation and autonomous drilling solutions?
MR: MBI Global has already developed and deployed semi-automated deep-hole drilling rigs in Chile. Moreover, we are investing heavily in AI. For the past two years, our R&D team has been developing AI-enhanced functionalities for our underground drills. The goal is to transform drilling operations by leveraging real-time data to optimize drilling paths, reduce human error, and enhance operational safety. Automation makes the work less physically demanding and more appealing to younger generations and underrepresented groups. We see autonomous drilling as an enabler for greater inclusivity in the workforce.

What sustainability and safety strategies is MBI Global implementing?
MR: Our sustainability strategy begins with understanding the full life cycle of drilling operations. Since we are also drillers, we know the on-the-ground realities. We prioritize health and safety, which are foundational elements of sustainable mining. Furthermore, we spend significant time in the field gathering insights that feed back into product development and help us continuously improve.

MQ: Chile has some of the most stringent regulations globally, especially concerning safety. MBI Global embraces this challenge. We ensure our products exceed local standards by incorporating advanced safety features such as remote operation, area restriction sensors, and user-friendly control panels.

The reduced need for manual intervention translates into fewer injuries and near-misses. In addition, by defining safe zones and automating critical functions, we contribute to overall project continuity and investor confidence. A single incident can halt a mining operation indefinitely, affecting valuations and strategic timelines.

Can you explain the significance of the Neolithik product line?
MR: We face stiff competition from countries offering cheaper products. However, quality matters. In drilling, failure in the hole can be catastrophic. Neolithik consumables are engineered for durability, reducing the risk of tool failure and lowering overall operational costs for both drilling contractors and mine owners.

MQ: Neolithik is a proprietary product line that represents strength and durability. It includes rods, bits, heads, and other drilling consumables.

What are MBI Global's plans for growth?
MQ: Our growth strategy includes forging long-term alliances with clients, offering flexible purchasing models such as consignment, and expanding our local inventory of both machines and parts. The goal is to be a one-stop solution provider, deeply embedded in our clients' operational planning cycles.

MR: Our vision is encapsulated in the phrase 'Stronger and Stronger.' We will continue expanding our global presence, improving operational efficiencies, and strengthening local teams. We are not looking to enter every market, but rather to solidify our leadership in the strategic ones we already serve, and to scale in a way that benefits both our clients and our internal growth. South America is crucial to MBI's global strategy. As exploration moves deeper, our high-performance rigs and consumables are well-positioned to meet the demand. ■

Pablo Wallach Beovic

VP Innovation and Marketing
ENAEX

Can you outline ENAEX's work in low-carbon products?
In Peru, we have successfully manufactured green hydrogen, producing a product called Prillex Zero, which is fully produced using renewable energy.

In Chile, we are producing a product called Prillex ECO2, which uses blue ammonia. This approach reduces the carbon footprint by 40-50% compared to regular ammonia.

What technologies are transforming mining according to ENAEX?
We are focusing heavily on robotics to reduce human exposure to dangerous areas. A prime example is our underground teleoperated truck (UG-iTruck), which we are currently testing at Codelco's El Teniente mine, and can be controlled from 1 km away and perform the entire blasting process, including priming, hole cleaning, and programming contactless detonators.

Can you elaborate on ENAEX's digital platform, Bright?
Bright is our comprehensive digital platform designed to gather extensive information from the mining process. It collects data from various sources including trucks, detonators, sensors, fragmentation cameras, drill machines, and other equipment. The platform includes several innovative tools that transform this data into actionable insights.■

Christian Barra Llano

General Manager Chile
ORBIT GARANT

With more mines going further underground, how is Orbit Garant adapting its techniques and equipment to this challenge?
At Orbit Garant, we manufacture our own equipment for underground and surface drilling. This allows us to adapt each drill rig to meet the specific requirements of each tunnel and client. At El Teniente for example, we are currently trialing an upgraded drill to improve capacity, performance, and semi - autonomy.

Currently, we are working on developing a robotic arm that allows an operator to manipulate the drill more easily. This is not only a technological advancement but allows the drilling sector to be more inclusive and open, as less strength is required to operate such drills.

What are your plans and goals for Orbit Garant in Chile in 2025?
2025 marks the company holding's 40th anniversary, and our main objective is to consolidate our new projects and build on the equipment we have alongside our team in Canada. This will involve testing and gaining licenses that will allow us to expand our client base both within Chile and internationally. With our technology we are looking to make sound investments, as sometimes buying the cheapest kit is not advisable, and a more expensive product will last longer in the field. ■

Nigel Smith

General Manager
EXPLORATION DRILL MASTERS (EDM)

Can you introduce our audience to Exploration Drill Masters and how you add value to mining projects?
Exploration Drill Masters (EDM) is a very well-established, globally renowned OEM of exploration drills and equipment. We manufacture a wide range of equipment primarily for the exploration sector. We have always focused on product development, particularly R&D for safety and hands-free drilling. Chile is a great proving ground for products because most of the drilling in Chile is in challenging conditions at altitude. We therefore gained a reputation for supplying robust and productive drills in very tough environments and now are firmly embedded in the global mining community.

What are some of the trends affecting the drilling sector currently?
The increased demand for critical minerals and the general lack of new greenfield exploration over recent years means that significant growth for both greenfield and brownfield projects is expected. We are seeing some new companies establish themselves and increased activities from companies already present. We are seeing clients wanting to drill deeper and transition to safer hands-free equipment in many regions. ■

Flexible Foundations

Modular solutions to meet the demands of high-altitude mining

Infrastructure and logistics companies face unique challenges in Chile, with mines up to 4 km above sea level and thousands of workers on-site at a time. For these companies to adapt and survive, they are innovating new solutions to better serve the mining industry's needs. This includes using modular camps and infrastructure that make transportation easier between the remote locations of mines.

Promet constructs camps for many of the major mining companies in Chile and Peru. "By offering modular services, we allow for flexibility and sustainability, making investments more efficient. Instead of clients investing heavily in infrastructure that they may not need later, we invest in scalable solutions, moving assets between projects as necessary," commented Cristobal Schneider, the CEO of Promet, continuing: "We offer flexible business models, such as renting camps instead of selling them, to accommodate fluctuating labor demands during construction and operation phases."

Similarly, Tecno Fast built camps for mines like Centinela. Cristian Goldberg Aichele, general manager, said: "Tecno Fast is already fully prepared for increased demand in modular services, benefiting from years of steady work, a strong internal talent that have allowed it to maintain skilled teams in essential roles and last but not least, our solid financial support to overtake big and complex projects. The company has significant installed factory capacity, with three factories in Chile and a fourth set to open in Puerto Varas in April, further enhancing its ability to meet high demand."

Modular construction company Tarpulin works with ports, logistics, and mining companies, witnessing much growth in modular floors over the last few years, which are manufactured with recycled plastic. The company is looking to open an injection plant in Antofagasta to boost sustainability and be closer to clients. "This will eliminate transporting plastic waste from Antofagasta to Santiago for crushing, cleaning, and injection. This will enable us to carry out the entire recycling process from receiving waste and transforming it into sustainable recycled floors, locally in Antofagasta," highlighted CEO Pablo Rosales.

DEX specializes in the manufacturing of high-resistance, patented modular industrial flooring. Their association with Tarpulin to reduce the cost and improve the quality of modular flooring has been pivotal for getting the company recognition in the industry. "DEX floors are utilized in Chile's primary mining operations due to their high resistance and rapid installation. Four individuals can install 1 km2 in a single day, making our solutions highly cost-efficient," explained Francisco Cruz Quiroga, CEO of DEX.

As modular services become more popular, companies in the infrastructure space only stand to benefit from preparing now. "The rise of modular products and the impending mining boom present opportunities across multiple fronts, revitalizing the entire mining value chain, including its providers," added Cruz Quiroga.

Benefitting from the increase in modular services is the heavy lifting and transportation company Mammoet. In 2024, Mammoet's flagship project was the relocation of a crusher plant at the Radimiro Tomic mine, and is evolving to serve all mine types and geographies. Vanessa Labana, head of business development for Mammoet Chile, noted: "We are aligning our services with the growing copper and lithium sectors by shifting from standard transport to tailored heavy-lifting solutions. Our studies evaluate construction methods, port access, and transport routes."

Despite tough years in the Chilean market, steel structures business EDYCE remains hopeful that the many projects which companies have slated for the coming years cannot be delayed much longer, and thus their services will be required more in 2025. "We worked for many years in developing our modularization offerings, and that has been one of the main services that have allowed us to obtain work that we otherwise would not have gotten. We are building big modules and are exploring joint ventures with companies that provide mechanical or electrical equipment," said Tomás Fischer, CEO of EDYCE.

Chile's mining sector relies on adaptable, sustainable infrastructure to meet the challenges of remote, high-altitude sites. Modular construction, localized services, and innovative logistics are enabling efficient operations and long-term flexibility. As mining moves towards a more sustainable future where projects will need to be deconstructed just as fast as they are implemented, modular infrastructure and the accompanying logistics will be vital to the industry. ■

Tomás Fischer
Executive Director
EDYCE

"We believe that we are in a transition year where there are so many projects ready to go that they cannot keep being postponed. We expect that 2026 to 2029 should be very interesting years."

Image courtesy of Tarpulin

> We are working to enhance the aesthetics of mining camps, shifting from the lowest-cost approach of the past to creating environments that retain talent and improve living conditions.

Cristóbal Schneider

CEO

PROMET

What have been the most significant milestones for Promet in 2024?
A key milestone was our expanded presence in the energy sector, building on our experience in mining, camp operations, and energy generation. Our operations in the hotel industry also saw significant growth, effectively doubling in scale. It was also a year in which we finished several interesting projects, and additionally, we strengthened relationships with key players in the mining sector in Chile and Peru, focusing on sustainability, habitability and efficiency.

How do you adapt your solutions to the different environments in Chile?
Operations in Chile are often in remote locations, far from urban centers. In Chile, obtaining permits is a major challenge. We address these challenges by integrating early into the engineering phase of projects, ensuring compliance with permits and anticipating operational needs. We offer flexible business models, such as renting camps instead of selling them, to accommodate fluctuating labor demands during construction and operation phases.

Adapting to clients is essential, especially as operations expand and evolve. We do not just provide lodging; we manage every aspect of camp life, including food, energy and water supply in complex locations. By offering modular services, we allow for flexibility and sustainability, making investments more efficient. Instead of clients investing heavily in infrastructure they may no longer need later, we invest in scalable solutions, moving assets between projects as necessary. This ensures sustainability while making mining operations more attractive to workers.

Are there specific markets where you see expansion opportunities?
Lithium presents an important growth opportunity, but its operations require less labor than traditional mining. We are also working to enhance the aesthetics of mining camps, shifting from the lowest-cost approach of the past to creating environments that retain talent and improve living conditions for workers and executives alike.

How is Promet looking to offer more comprehensive services?
Our services are comprehensive, covering all essential aspects of hospitality and site management. These include hotel and camp operations, food services, as well as housekeeping and maintenance to ensure a clean and comfortable environment. Additionally, we provide security services tailored to the specific risks associated with mining environments, independent energy generation, and a reliable potable water supply.

Beyond these essentials, we offer specialized training facilities for workers and recreational amenities such as soccer fields and gyms to enhance the quality of life for residents. Our goal is to establish ourselves as a key player in large-scale mining projects by alleviating investment burdens for companies and delivering more integrated, efficient solutions.

How is Promet addressing the talent shortage in the mining industry?
Talent retention is a major challenge, and while we currently maintain a strong team of over 1,500 workers, the situation in the next few years remains uncertain. We attract employees by fostering a positive work environment and emphasizing the impact of our work—such as improving mining habitability and entering the housing sector to provide homes for Chileans and Peruvians. For our clients, we help attract workers by improving living conditions at mining sites. This includes modernizing accommodations with smart technology, recreational facilities and entertainment options. Mining companies can no longer rely solely on salaries to attract young talent; they must also provide a better living experience, and we are committed to supporting them in this effort.

How are regulations impacting the Chilean mining sector?
The biggest regulatory challenge is the permit process. Investment in mining is increasing not because of regulatory ease, but due to rising demand for copper and lithium in the global transition to electromobility. However, long approval times, sometimes several years, create uncertainty and hinder projects. Investors need clarity: if a project is not viable, they should be told quickly rather than being delayed for years. Additionally, labor shortages and execution issues have caused project delays, making investors hesitant. Ensuring a steady supply of skilled labor and streamlining permitting processes will be key to sustaining future investments.

What are Promet's main priorities in Chile for 2025?
We aim to solidify our position as the leading provider of habitability solutions in the mining and energy sectors. Our focus will be on offering flexible, customized solutions that meet industry needs while ensuring we fulfill contract commitments. ■

Pablo Rosales

CEO

TARPULIN

> Companies are incorporating better architecture to give mining camps a better design, look and feel, all whilst integrating sustainable techniques.

Can you introduce Tarpulin to our audience?
Tarpulin is a modular construction company, specialized in projects requiring modular warehouses, dining rooms and industrial buildings in general. Our main clients are mining, ports and logistics companies. Therefore, whether directly or indirectly, we are normally present in the mining ecosystem.

How is Tarpulin overcoming the challenges of attracting and retaining labor?
It is a challenge to maintain a balance of efficiency and productivity together with meeting the expectations of our workforce. We strive to be able to offer our workers a project that makes sense for their long-term development and that motivates them. To achieve our goals in this matter, we have a 'People's Manager' who is focused on organizational development, focused on people and their needs and how to create a satisfactory project for them in Tarpulin. We also develop local talent, contractors and subcontractors in the Antofagasta region to help reduce our carbon footprint, who contribute to the creation of a more specialized workforce and boost the local economy.

As labor laws evolve in Chile, so does the modular construction sector. We try to be efficient without pressuring staff to ensure safety, and because of this, the quality of camps is generally increasing. Companies are incorporating better architecture to give mining camps a better design, look and feel, all whilst integrating sustainable techniques.

What is Tarpulin's approach to reducing its carbon footprint?
We have measured our carbon footprint, enabling us to inform our clients of the specific amount of CO_2 we are generating. Our next step is to act on these figures to reduce them. An area in which we have seen much growth in Tarpulin over the last year is modular floors, which are manufactured with recycled plastic to replace concrete slabs.

To make this even more sustainable and low-CO_2 focused, we are working with a new injection plant in Antofagasta, with the company DEX. This will eliminate transporting plastic waste from Antofagasta to Santiago for crushing, cleaning, and injection. This will enable us to carry out the entire recycling process from receiving waste and transforming it into sustainable recycled floors, locally in Antofagasta.

What is the added-value of Tarpulin's services?
Our construction model is attractive to mining companies and related industries due to its lower cost and faster delivery times. We also rent warehouses that are assembled on our clients' land, so flexibility is also a key factor. Another driving factor of our business is environmental permits as they are complex and take a long time to obtain, which increases the need for our solutions to be at a mine site for longer before development can start.

What is Tarpulin's footprint like in the rest of Latin America, and do you see opportunities for expansion into foreign markets?
We currently operate projects in Peru, and we are experiencing a growth in RFP from Argentina, Ecuador and Colombia. For the moment, we have only exported supplies to those countries, but the plan is to go further, increasing our manufacturing capacity to attend to those markets. The market in Argentina has been evolving since the change in administration, and this has translated into more business for Tarpulin in the country as companies look to revive long-term projects.

What is the role of technology at Tarpulin?
Technology is very relevant to us, but we acknowledge that we are behind and need to catch up. For that, we are working with a company well-versed in AI to boost our business and data analysis for decision-making. One of our commercial projects has just been approved, and that involved the use of AI to aid in the sales, the CRM area, and in data analysis, aiding customers in strategic decision making.

What are your plans for the future of Tarpulin?
Tarpulin enters 2025 following a strong performance in 2024, having already made strategic investments in the early months that are expected to yield returns throughout the year. Our focus will be on consolidation, while continuing to pursue organic, strategic, and sustainable growth. We aim to foster innovation, think beyond conventional solutions, and further integrate new technologies into our operations. ■

Cristian Goldberg

General Manager

TECNO FAST

What trends are you observing in the demand for Tecno Fast services?
Clients are increasingly demanding more comprehensive turnkey solutions, and Tecno Fast has long been committed to delivering fully managed camp operations. Leveraging its experience in managing hotels and large-scale camps, Tecno Fast prioritizes efficiency, allowing clients to work with a single provider instead of multiple contractors. This year, the company's focus is entirely on innovation, particularly through AI.

How are the expectations of mining companies evolving regarding camp infrastructure in your experience?
Mining companies have always been concerned about quality. Working up in the mountains in complex conditions, our clients have always kept this in mind, and we have always aligned ourselves with that, being able to deliver faster and better solutions with technical comfort so they can have a safe place to perform their functions.

More than these types of things, I see an important change in how some mining companies view the mining of the future. Some companies now have a 40% female workforce, which is truly impressive. There is now a concern for people to be in a safe place and perform their functions without any risk, I would say that is indeed a change. We just created an ESG department where we measure the carbon footprint of our processes and the possibility of neutralizing the emissions that we generate when executing our projects.

With major mining companies announcing billions in investments, how is Tecno Fast preparing for this growth in demand for modular services?
Tecno Fast has significant installed factory capacity, with three factories in Chile and a fourth set to open in Puerto Varas. Over the years, Tecno Fast has successfully diversified beyond mining, with 40% of its business now coming from markets outside Chile, including Spain, Peru, and the United States. ■

Francisco Cruz Quiroga

CEO

DEX

Can you introduce us to DEX and summarize how the last two years have been for the company?
DEX specializes in high-resistance, patented modular industrial flooring. Our journey began in 2021 with Tarpulin, whose expertise in modular systems complemented our initial product line perfectly. We established DEX with a core commitment to the circular economy, ensuring our long-lasting products are made entirely from recycled plastic. This sustainable approach extends to our entire production process, from molds to the final flooring, all designed to utilize recycled materials without compromising quality.

How do DEX's products contribute to safer, more efficient, and sustainable mining?
DEX floors are utilized in Chile's primary mining operations due to their high resistance and rapid installation. Four individuals can install 1,000 m2 in a single day. Beyond flooring, we also offer services to process mining clients' plastic waste into bespoke products or improved components. Furthermore, our floors eliminate the need for costly land restoration upon dismantling a construction, as the site remains largely undisturbed.

How is your association with Wenco facilitating the opening of the new factory?
Our association with Wenco is pivotal for the new factory. Building a facility from scratch is complex, but this partnership streamlines the entire process, as Wenco owns the machinery, and we own the plastic injection molds. Wenco has evolved from a supplier into a strategic ally, significantly bolstering our R&D capabilities and contributing to our growth. While our initial plan was independent factory development, Wenco's strong interest led to a mutually beneficial collaboration, expanding their northern presence and providing us with invaluable manufacturing, procurement, and logistics expertise. As a plastic industry leader, their proficiency in these areas far exceeds our own. Crucially, our output of 100% recycled high-density polyethylene will increase dramatically upon the factory's opening, boosting our current processing capacity by up to 50%.■

Sustainability as a Science

Engineering firms look to cement their place in the mining boom

From developing greener reagents to minimizing energy consumption and ensuring responsible water management, lab services and laboratories enable mining companies to meet the stringent environmental mandates that Chile imposes on companies operating within its borders.

BASF puts a lot of its recent success down to its lab in Antofagasta, which gives the company proximity to its customers. The laboratory is at the forefront of producing hydrometallurgical reagents that are designed to lower the environmental footprint. "Sustainability is one of the key pillars of our strategy. For example, globally, by 2030, we aim to reduce our greenhouse gas emissions by 25% compared to 2018 data, and by 2050, we target to achieve net zero. Considering our global portfolio, one-third of our products are already classified as sustainable," explained Gulden Ergun, manager of mining business, BASF Chile.

Furthermore, by tailoring tests to local ore characteristics and water chemistries, BASF helps operators optimize copper recovery with fewer chemicals and less acid consumption. Ergun added: "LixTRA supports environmentally responsible mining by reducing net acid consumption, lowering overall mining costs, and extending the life of mines. It enhances recovery from historically difficult-to-leach primary sulfides and integrates well with other emerging leaching technologies, particularly in the field of primary sulfide leaching."

Embedding sustainability into its lab infrastructure and protocols has been an important part of Bureau Veritas as it heads towards its 200th anniversary in 2028, a strategy the company calls Leap28. In Chile, Bureau Veritas is leveraging automation, renewable energy and circular economy principles to make its testing services greener. "Clients today expect service providers to incorporate sustainability principles into their operations, and we embrace that responsibility. In mining, the shift towards using industrial water and desalination poses operational challenges, and Bureau Veritas supports clients by testing processes, ensuring water quality, and informing decision-making to manage risks," outlined Marco Santos, director of minerals and metals at Bureau Veritas Chile.

Beyond testing ore and process streams, the company also assesses recycling streams. By certifying reused materials and advising on circular workflows, Bureau Veritas ensures that mining sites can close resource loops rather than rely solely on virgin inputs. Carlos Guzmán, country chief executive of Bureau Veritas, revealed: "Our laboratories operate with renewable energy, and we are certified under ISO 50001 for energy efficiency. We actively support clients by inspecting water transport infrastructure and promoting circular economy initiatives, such as recycling work uniforms."

SGS is known globally for its testing, inspection, and certification services, which in Chile have led to the company naturally playing a role in the mining industry. SGS's Natural Resources division has embraced digital transformation to provide real-time, on-site testing that drives both operational efficiency and environmental compliance. "Older mineral deposits and deeper mining operations increase treatment risks, quality risks, regulation risks, and carbon footprint concerns. Any increased movement, whether energy, water or fuel consumption, generates risk, especially today with sustainability concerns," highlighted Mauricio Rocha, managing director of SGS in Chile.

Rather than shipping samples off-site and waiting days for results, SGS deploys sensors, hyperspectral imaging, and remote monitoring to continuously track process parameters, which can help conserve resources. Rocha elaborated: "The need now is to measure on-site and deliver results practically in real-time so the result calibrates faster than the variability. This requires digital solutions: sensors, digital monitoring tools, and control-room oversight to track variations in equipment status, corrosion levels, or potential failures."

Laboratories have evolved into strategic champions of sustainability in Chilean mining. By aligning test methods with greener chemistries, powering labs with renewables and circular-economy principles, and embedding digital, on-site monitoring to minimize waste and emissions, Chile's laboratories sectors demonstrate how advanced lab services are indispensable for reducing environmental impact. As Chilean mining pursues net-zero targets and tighter water regulations, lab-driven insights and innovations will continue to safeguard both profitability and the planet. ■

Image by Bruno Weltmann at Adobe Stock

Gulden Ergun

Manager of Mining Business
BASF CHILE

What kind of improvements can your products like Lixtra deliver?
With Lixtra, we are targeting increased efficiency in the leaching process. We can increase copper recovery without harming the solvent extraction-electrowinning processes. The results are promising considering that we work with mines of different ages and with different copper content.

Additionally, LixTRA supports environmentally responsible mining by reducing net acid consumption, lowering overall mining costs, and extending the life of mines. It enhances recovery from historically difficult-to-leach primary sulfides and integrates well with other emerging leaching technologies.

What is the current focus of BASF Chile?
We have noticed that while the industry values high performance, for many customers, cost is the main driver. With this feedback, we developed an 'economy line' of products with standard performance in addition to our already existing specific solutions.

What are your objectives for BASF Chile in the mining sector for 2025?
We started our strong growth in hydrometallurgy in 2023 and we want to continue extending it. ■

Mauricio Rocha

Managing Director
SGS CHILE

How are trends in the wider mining industry affecting SGS?
Older mineral deposits and deeper mining operations increase treatment risks, quality risks, regulation risks, and carbon footprint concerns. The sustainability of Chile's industry is particularly at risk compared to other countries due to industrial evolution. This affects not just mining but all sectors facing environmental regulations and climate change impacts.

What clients need today is more than just standard services - they need risk control. This shifts our service portfolio toward digital solutions, sustainability, and comprehensive approaches. Previously, we might have done specific testing or inspection and delivered results. Now clients require integrated services that address sustainability concerns, waste management, community relationships, and labor issues.

How is SGS integrating digital transformation?
We are implementing hyperspectral technology, advanced imaging, electronic microscopy, laser integrity testing, and remote monitoring. Clients can place sensors to measure turbulence, nutrient levels, contamination, or noise in marine environments. These digital tools create mathematical models that establish predictions and projections, reducing operational risk and helping secure operating licenses. ■

Carlos Guzmán

Country Chief Executive
BUREAU VERITAS CHILE

How does the acquisition of GeoAssay strengthen your operations in Chile?
CG: GeoAssay currently has two facilities with highly specialized technical personnel in laboratory analysis, chemical analysis, and, most importantly, advanced technology and innovation. This allows a high scalability of the processes we currently have in Chile.

What is the scope of your partnership with Veracio and its impact on your innovation efforts?
MS: Veracio supports us in geological mapping with artificial intelligence, helping us deliver the precision and faster response times that clients are demanding. As mines age and fewer new projects emerge, greater precision in geological information becomes crucial.

Which services are currently most in demand in the Chilean mining market?
MS: Mining companies today are focusing heavily on grade precision and quality assurance throughout their processes. Mechanical sample preparation and chemical analysis play a fundamental role in achieving this.

The almost two centuries of accumulated experience we have allow us to provide clients with knowledge-driven, sustainable, and future-ready solutions. ■

The Human Side of Maintenance

Competition for skilled labor heats up in the Andes

Maintenance plays a critical role in ensuring the reliability, safety and productivity of Chile's mining operations, especially as the country's mines become increasingly automated and remotely operated. However, the sector faces a tightening labor market, where service providers must compete with large mining companies for skilled personnel. The harsh working conditions and remote locations typical of Chilean mining only compound the difficulty of attracting and retaining talent. As a result, maintenance companies are being pushed to develop more innovative human resource strategies, invest in training, and deepen ties with local communities to build and maintain a stable, skilled workforce.

Chile presents unique challenges to companies regarding labor shortages, as many of the mines are located in the remote north of the country, where there is a particular lack of training and skilled labor compared to more urban regions like Santiago. "For example, in the Antofagasta region there is high demand for labor, yet a scarcity of available workers, which can lead to absenteeism and excessive medical leave. While we are well-equipped to work in various terrains and altitudes, the human element poses the greatest challenges," said Ignacio Pérez, general manager of Nexxo, a leader in providing long-term maintenance services to Chile's mining industry as part of the Echeverría Izquierdo Group, continuing: "Our focus remains on building strong relationships with our workforce to foster loyalty, commitment, and a stable work environment."

Fluitek represents product lines in Chile on behalf of companies like Rexroth Bosch and Gore sealing systems, and has recently started moving towards more long-term work in maintenance and installations rather than just sales. The company has noted how competition with mining companies for qualified personnel is affecting this expansion. "Competing against large mining companies with completely different conditions is challenging. They offer many benefits related to copper prices - if copper prices rise, they offer more benefits and become more attractive. It has not been easy for us to retain talent, but we use formulas and try to get close to our personnel and develop them," said Alan Fraser, Fluitek's general manager.

Service companies cannot offer such benefits as their margins are affected by many more factors, meaning they have had to come up with more innovative solutions in order to attract and retain talent.

Recognizing the difficult conditions mine workers operate in and how this makes it harder to attract the required talent to the industry, service company Ferrostaal is putting in more internal systems and initiatives to help with this challenge, and in the hope of being able to increase their client base. Pablo Sánchez, CEO, said: "We have a whole process where we connect with communities, municipalities and institutions. We also developed internal software to manage the database of collaborators. When a project comes, we

Ignacio Pérez
General Manager
NEXXO

> "The most notable trend is the shift from clients seeking service providers to desiring strategic partners. They are prioritizing comprehensive service offerings that emphasize safety, worker well-being, and strong, collaborative relationships."

Image courtesy of Confipetrol

put them through a series of psychological and knowledge tests because the jobs are risky and we need to have good indicators and ensure that all people are safe."

The company achieved record results in 2024, executing two ENAP refinery shutdowns ahead of schedule involving over 2,000 workers. Ferrostaal works on the maintenance of the electrical and communications systems at El Teniente. With around 80% of the mine run from the operations center in Rancagua, constant maintenance is vital to the overall operation of the mine.

In 2024, Equans was able to secure a new contract and consolidate its mining maintenance expertise, with a strong presence in northern Chile of over 1,100 workers in the Antofagasta region. The company is committed to using local teams, rather than running its operations purely from Santiago, looking to address diversity in its workforce as a result. Christian Diaz, CEO of Chile and Latin America, Equans, commented: "We aim to increase female participation in operations, not just in back-office roles but also in fieldwork, where we believe women bring significant value to mining operations. We are committed to providing equal opportunities for all employees, fostering an inclusive environment, and supporting local communities."

However, having such specialized talent in the field is not always easy. "There is a clear gap between specialized technicians and supervisors. Many technicians aim to move into supervisory roles, which creates a shortage of highly skilled field personnel. To address this, we implement training plans that strengthen the skills of our current workforce, allowing us to fill service gaps across our operations. In addition, we offer retention packages and career development plans," explained Jeant Peinado, general manager for Confipetrol in Chile.

After expanding into the Chilean market, Confipetrol has experienced 100% growth year on year and was recently awarded a five-year contract with Codelco's Andina Division. For this contract to be carried out successfully, challenges in the workforce will need to be addressed systematically to make Confipetrol as efficient and productive as possible. "We have implemented strategic plans in health, safety, quality, and environmental areas, all under a unified HSEQ management system. We place strong emphasis on awareness and internalization of safety. Safety should not just be a checklist; it must be ingrained in every worker's mindset. We train our teams to think and act safely, to look out for each other, and to strictly follow safe work procedures," continued Peinado.

Despite strong growth and new contracts, maintenance companies in Chile's mining sector face persistent challenges in sourcing and retaining specialized talent. The competition for workers, particularly in northern mining hubs, is fierce, and service providers must often overcome limited margins and less attractive benefits than the mining operators themselves. Success increasingly depends on their ability to create inclusive, safety-driven workplaces with clear development pathways and community engagement strategies. In a mining landscape where reliability and efficiency are non-negotiable, the evolution of the maintenance sector will remain central to sustaining Chile's global competitiveness in copper and beyond. ■

> "Confipetrol's growth plans in Chile are ambitious but realistic. The company aims to double its workforce annually and proportionally increase its sales."

Jeant Peinado

General Manager Chile

CONFIPETROL

How has Confipetrol's presence in Chile evolved over the last 12 months?

We have maintained a year-over-year growth rate of approximately 100%. In 2024, we achieved important success in bidding processes, receiving invitations from key clients such as Codelco. These efforts led to major contract awards at the end of 2024 and the beginning of 2025. Following our initial success in Chuquicamata, we secured a similar five-year contract with the Andina Division. We also entered the El Salvador Division and, more recently, won another significant contract in Chuquicamata. As of May, we have already doubled our revenue compared to the same period last year, with eight months still ahead and more projects in the pipeline.

How does Confipetrol ensure the health and safety of its teams at mining sites in Chile?

We have implemented strategic plans in health, safety, quality and environmental areas, all under a unified HSEQ management system. We place strong emphasis on awareness and internalization of safety. Safety should not just be a checklist—it must be ingrained in every worker's mindset. We train our teams to think and act safely, to look out for each other, and to strictly follow safe work procedures. Thanks to this approach, we have now gone over 24 months without any lost-time accidents.

How is Confipetrol addressing the challenge of attracting and retaining technical talent in Chile?

There is a clear gap between specialized technicians and supervisors. Many technicians aim to move into supervisory roles, which creates a shortage of highly skilled field personnel. To address this, we implement training plans that strengthen the skills of our current workforce, allowing us to fill service gaps across our operations. In addition, we offer retention packages and career development plans. Internal promotion is a top priority.

What sustainability practices has Confipetrol implemented?

In terms of environmental sustainability, we focus on circularity. Inspired by our operations in Colombia, we reuse uniforms and PPE through partnerships with local suppliers. These items are collected, cleaned, and repurposed into useful products such as hats, pouches, or promotional items. In Chile, we are beginning to replicate this model with local vendors. From a business standpoint, we developed a five-year strategy, identifying nearly US$3 billion in business opportunities. This data guides our planning and strengthens our position in a market dominated by major players.

How do Confipetrol's operations in Chile differ from those in the rest of Latin America?

While our core principles remain the same, the mining sector in Chile presents unique conditions: larger equipment, more remote sites, and different environmental challenges. Our background in the oil and gas industry has shaped a structured management culture, which we apply to mining—always upholding our engineering and maintenance philosophy as a core value.

What services does Confipetrol offer in maintenance, and where do you see the greatest growth in Chile?

We provide maintenance services in mechanical, electrical, welding, instrumentation, and control specialties, focusing on equipment in extractive sectors. In Chile, we see the greatest growth potential among companies looking to optimize productivity without increasing costs. These clients need maintenance solutions that are reliable, efficient, and tailored to high-demand environments.

How is Confipetrol utilizing Industry 4.0 and digital technologies?

Confipetrol is actively adopting digital technologies and Industry 4.0 to enhance its predictive maintenance approach. We use tools such as vibration analysis, thermography, acoustic ultrasound, and dynamic monitoring of electric motors. These technologies, combined with artificial intelligence and data analytics, allow us to anticipate failures, optimize resources, and make more accurate decisions.

We also have technical committees that meet quarterly to analyze trends, define technology investment priorities, and propose innovations. This approach keeps us at the forefront and enables us to offer increasingly smart and efficient solutions to our clients.

What are Confipetrol's future growth plans in Chile?

Confipetrol's growth plans in Chile are ambitious but realistic. The company aims to double its workforce annually and proportionally increase its sales. Given the size and dynamism of the Chilean mining market, we see these objectives as entirely achievable.

To achieve this, Confipetrol is positioning itself as the strategic maintenance partner, with a differentiated approach based on high standards of safety, operational reliability, and responsiveness. With new opportunities developing, the company seeks to strengthen its leadership by delivering solutions that generate real value for clients. ■

Christian Diaz

CEO of Latam

EQUANS

How has Equans evolved in the past year in the Chilean mining industry?
We have built a strong presence in northern Chile, particularly in Antofagasta, where we have over 1,100 employees. This regional focus emphasizes our belief that mining is inherently local, and we have committed to building strong local teams rather than managing operations from Santiago. Over the year, we secured new contracts, expanded our client base, and consolidated our expertise in operation and maintenance services, particularly in electrical, mechanical, and HVAC services.

What current trends are you seeing in the demand for services in the mining industry?
Electrification is a major focus, and we are exploring ways to help mining operations reduce their carbon footprint. One of the tools we have developed, Trolley Assist, is a key part of our electrification efforts, enabling more sustainable transport within mining operations. In addition to electrification, we are focused on engineering, procurement, and construction projects, such as modernizing substations and replacing older transformers with environmentally friendly alternatives. One of the key areas we focus on is reducing reliance on thermoelectric generation and supporting the integration of cleaner energy solutions.

Can you elaborate on the Trolley Assist technology and its benefits?
Trolley Assist technology is an innovative solution aimed at reducing emissions and improving productivity in mining operations. The key advantage is its ability to reduce the carbon footprint of traditional diesel-powered trucks, which are a major source of emissions in mining. With Trolley Assist, mining trucks are partially electrified, allowing them to operate with reduced fuel consumption and lower emissions. The benefits are clear with up to 50% reduction in carbon emissions, 35% less fuel consumption, and increased productivity due to faster slope travel. This technology helps achieve a significant environmental impact while also boosting operational efficiency, making it a win-win for both sustainability and productivity. ■

Pablo Sánchez

CEO

FERROSTAAL

What were Ferrostaal's recent achievements?
Last year we completed one year working in Chuquicamata. We have been working for a long time in El Teniente doing electrical maintenance and maintenance on communications networks and underground locomotives that Codelco has.

How significant is Codelco's Integrated Operations Center in El Teniente?
El Teniente has the largest control center in the world. More than 80% of the mine is teleoperated or remote-controlled from Rancagua. The Integrated Operations Center (IOC) is something we Chileans should be very proud of. There are walls full of screens with people with monitors controlling, seeing variables, the number of people, ventilation, electricity, transportation, all in real time, giving instructions to teams in the field. Ferrostaal is a key part of this achievement as we provide the hardware and maintenance for these rooms.

Our goal is simple: keep Chilean industry running with the very high productivity and decarbonise it along the way. We invite miners, energy companies, and industrials to co-create the solutions that will define the next decade.

What new strategy is Ferrostaal launching regarding decarbonization?
We already have associations with two very important German technology companies. One of them has technology to develop synthetic fuel plants. In a space similar to a container, they develop an entire plant where CO2, water, and electricity from a renewable source enter, and gasoline comes out. The other German company develops batteries for wind and solar generation on a large scale. Instead of using lithium, they use a compound from the cellulose process called lignin. When these batteries lose their useful life or if an accident occurs, it is much more environmentally friendly.

These two technologies might be more expensive on average, but as they have special characteristics, so that in some cases they could bring side earnings or synergies that can make them more competitive than regular solutions. ■

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Thank you!

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