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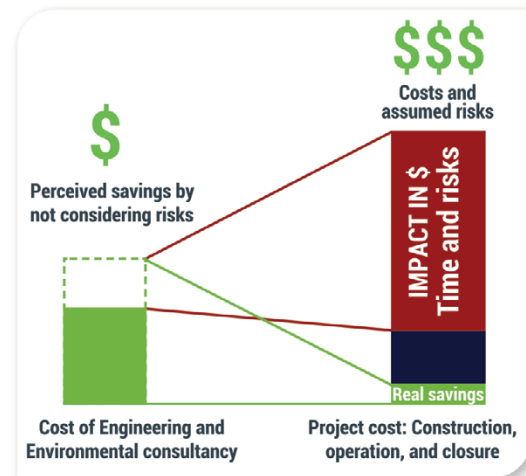


Aiming for...

No Risks, no Regrets.

The 7 risks for mining companies when choosing consulting for their projects

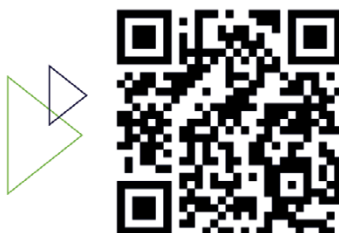
To rapidly and safely advance their projects, every executive within a mining company needs to seek support from a specialized Engineering and Environmental company capable of solving a problem or seizing an opportunity.



The selection of this consultancy is fundamental and critical for the development of a project, improving construction conditions, operation, and planning closure. Often, decisions made when unaware of the risks associated with selecting a consulting firm far outweigh the potential benefits gained in terms of project time or cost.

To assist you in your decision, below we list the **seven risks** to which you could expose your company if you fail to consider certain crucial aspects when choosing the Engineering and Environmental consultancy for your projects.

- 1 Choosing a consultancy without local and international knowledge.
- 2 Selecting a consultancy without the necessary experience and expertise in all areas and phases of the project.
- 3 Choosing a consultancy that is unaware of or does not follow industry best practices.
- 4 Hiring Team "A" and receiving Team "B".
- 5 Low involvement of experienced individuals.
- 6 Choosing companies that are unaware of the importance of basic studies and fieldwork.
- 7 Hiring "shell" companies that subcontract the main specialties or professionals of the service.



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Photo courtesy of Minsur

The situation in Peru during early 2023 was marked by social chaos, impacting a significant portion of the mining industry. Amidst various messages about attempts to advance elections, President Dina Boluarte decided in June to remain in office until 2026.

As 2023 unfolded, reports suggested that the Democratic Republic of Congo (DRC) had overtaken Peru as the world's second-largest copper producer. Meanwhile, Quellaveco, operational since 2022, was the last greenfield project to be developed in Peru, where no similar new projects are on the horizon.

However, in February 2024, the Peruvian mining industry breathed a sigh of relief when the Ministry of Energy and Mines (MINEM) announced that copper production in 2023 reached 2.75 million t/y, a 12.7% increase from 2022. This record was driven by Quellaveco's output and the uninterrupted operation of MMG's Las Bambas since the second quarter of 2023. According to the MINEM and the USGS' Mineral Commodity Summaries 2024, Peru remained the second-largest copper producer, with the DRC producing 2.50 million t/y.

This news is significant, especially considering the importance of being the world's second-largest copper producer in the eyes of investors. The mining industry contributes 11% to Peru's GDP and private investment, a significant figure given Peru's global macro-economic context.

In addition to political turmoil, the effects of El Niño, Cyclone Yaku, a monetary policy fighting inflation, and weak international growth have taken a toll on the Peruvian economy. According to the latest data attributed to INEI, most productive sectors have had a negative contribution to Peru's GDP growth, except for mining, which was positive, highlighting the importance of the industry for the country. As former Economy and Finance minister Alex Contreras said in the "Jueves Minero" forum organized by the Peruvian Institute of Mining Engineers in December 2023: "2023 has been one of the most difficult years of the last two decades, leaving aside the pandemic [...] Without mining, this small recession would have been worse."

The events of 2023 have caused investors to look for other regional options, and many are waiting to see what happens in 2026, an election year. When a country has an active pipeline with

"Antamina's life extension process is about to be completed after more than four years and a projected investment of US\$2 billion. It is not about increasing production but extending the mine's life, which has an equivalent economic impact on the country."

Víctor Gobitz,
President, SNMPE



progressing projects, two years, in mining terms, is ephemeral. For Peru, two years is an opportunity to lose without new projects on the near horizon. "I believe that everything that transpired during 2023 has significantly undermined business confidence for investment, and this is reflected in a substantial decline in investment across various sectors, particularly in the mining sector," commented Marcial García, partner at EY.

While it is true that there is a more positive atmosphere among C-executives this year compared to 2023, one cannot help but wonder if the country is in a bubble where the prevailing *status quo* could burst at any moment.

For it to burst, many factors would have to align. Nevertheless, the industry should not overlook this period of apparent tranquility: It must advocate for comprehensive national mining policies that transcend the current administration: "We need a leader in the Ministry with a deeper understanding of the mining sector to capitalize on its potential and to find mechanisms beyond permitting to promote the industry. We need a minister capable of working with various public and private entities to comprehensively address the problem of illegal mining. Action must move beyond speeches and announcements to concrete measures," declared Víctor Gobitz,



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president of the National Society of Mining, Petroleum, and Energy (SNMPE).

On February 13th, Rómulo Mucho was appointed Minister of Energy and Mines following a reshuffle in Boluarte's cabinet. Mucho, who served as the vice minister of Mines from 2005 to 2006 and has established connections with the industry, will bear the responsibility of bridging the gap between the private sector and the government in the forthcoming months. His role will be pivotal in fostering mutual understanding and aligning their views for the country's best interest.

The one-stop shop initiative

Óscar Vera, minister of Energy and Mines until February 2024, faced various challenges that affected the Peruvian mining and its attractiveness to investors. One of the main issues was permitting.

Peru boasts significant potential for substantial discoveries and the development of new mines, as demonstrated by projects like Mina Justa in 2021 and Quellaveco in 2022. However, the current government must implement measures to expedite permitting processes and streamline the existing project pipeline.

In recent months, the former head of MINEM appeared to have listened to the industry and, after working with the Executive Branch, who launched the "Plan Unidos" to reactivate the economy and boost the productive sectors, managed to include within the 25 measures a release of mining projects worth US\$4.64 billion for 2025 and US\$4.65 billion for 2026. Among these projects, we find the short-term extensions of Antamina and Toromochu (US\$2.41 billion), Yumpag, Romina, Corani, and Chalcobamba (US\$964 million), and Zafranal (US\$1.26 billion). Some of these projects have already obtained their respective permits. For example, Zafranal has received its Environmental Impact Assessment (EIA) approval. However, others, such as Corani and Romina, require their respective companies to address financial concerns before progressing with the project.

On the other hand, in February 2024, MINEM announced the launch of the 'digital one-stop shop' (VUD). Under this system, different widespread entities, like Senace, Ingemmet, and the Ministry of Culture, will work together to meet the deadlines for the

approval of permits and reduce a period that currently takes two years to six months.

The launch of the VUD seems to be a positive signal for the industry. Various stakeholders along the value chain are seeking not to lower international standards but to reduce timelines while adhering to the existing robust standards: "While the existing permitting process is robust and methodical, the key factor is time. Acknowledging the importance of time efficiency, a streamlined process can significantly benefit junior mining companies and expedite the realization of projects," commented Jay Chmelauskas, president and CEO of Camino Corporation.

It is impossible to predict whether the implementation of the VUD will effectively reduce the current delays in permits. Still, it is a positive sign that the current government has been responsive to the industry's concerns in recent months.

Illegal mining vs artisanal mining

To claim that the relationship between local communities and mining has improved would be inaccurate; it remains delicate. According to the Peruvian Office of the Ombudsman for the Prevention of Social Conflicts and Governance, as of December 2023, two thirds of the 134 active socio-environmental conflicts were mining-related, a percentage that is in line with 2022 figures as well. The toll of some of these conflicts is severe: In December 2023, a group of illegal miners attempted to seize control of Minera Poderosa's operations in Pataz, killing nine security agents by detonating multiple charges of ANFO (high-powered explosive) in one of the underground galleries of the mine. More recently, in January 2024, illegal miners brought down a high-tension tower that supplies power to the operations.

Based on information from the Financial Intelligence Reports (IIF) by the Superintendencia of Banking and Insurance (SBS), in their Financial Intelligence Unit (UIF) report of June 2023, illegal mining is the crime worth the highest accumulated amount, reaching US\$8.2 billion, surpassing drug trafficking, which amounted to US\$640 million.

In addition to the "synergies" among illegal mining and other illegal activities, which affect the sector's image, illegal mining has several environmental consequences, such as the indiscriminate use and disposal of

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mercury for gold recovery. Since illegal miners do not adhere to the regulations proposed by the government, unlike formal mining, illegal mining operations often neglect environmental safeguards.

Addressing illegal mining is a complex challenge. According to Marcial García, partner at EY, when informal mining emerges, there is no clear response, especially from specific leftist sectors that oppose formal mining activities due to environmental risks: "The lack of control has allowed these illegal activities to grow, even infiltrating certain power structures, backed by lobbyists who hinder necessary legislative changes," he explained.

The most delicate aspect in relation to illegal mining is its impact on Artisanal and Small-Scale Gold Mining (ASGM), particularly in terms of public perception. Unlike illegal mining, ASGM is legal and adheres to environmental standards. According to the World Gold Council, ASGM is among the fastest-growing rural livelihoods in numerous developing countries. Various reports from the UN Environment Programme and

the World Gold Council suggest that ASGM contributes between 15% and 25% of the world's gold. However, this practice is often overshadowed by the prevailing perception of environmentally unsound extraction methods and the association of such activities with illegal mining.

In Peru, specific figures regarding ASGM's contribution to the national gold output are not explicitly outlined by the MINEM. Nevertheless, Jean Martineau, president and CEO of Dynacor Group, observed its considerable impact: "It is estimated that between 22% and 24% of annual gold production comes from these miners, a significant percentage that continues to increase, unlike the conventional mining sector."

Dynacor is one of the few companies in Peru focusing on ASGM. To ensure that the gold they export to Switzerland does not originate from illegal mining, the Peruvian government requires the company to guarantee the traceability of gold to its origin. Additionally, according to Martineau, Dynacor adheres to rigorous due diligence when admitting new miners: "We set com-

pliance standards with 25 points that we check thoroughly. We maintain constant oversight of these criteria each time a miner returns, ensuring that they are met continuously," he concluded.

Peru has been trying to formalize several informal mining operations through the Reinfo (Integral Mining Formalization Registry). However, for Víctor Gobitz, president of the SNMPE, the Reinfo is not enough: "The solution does not lie solely in the Reinfo but in designing a broader and deeper strategy in collaboration with the government. It is necessary to understand the entire production chain and find ways to formalize it gradually, recognizing the complexity of the problem and avoiding social upheaval," he said.

The government has a lot of work ahead for 2024. It is crucial to continue efforts to streamline permitting procedures, where specific progress has been made, and address illegal mining. Considering the significant financial gains linked to this activity, there seems to be a tendency to focus primarily on formal mining operations adhering to strict national and international standards, thus increasing the pressure these companies face. ■

"Copper deposits are few and far between, and any 'easy' projects are already in operation. To meet the growing demand for copper, we must operate in increasingly complex environments that demand more advanced technologies and techniques, leading to higher costs."

Jorge Benavides,
Legal and Corporate Affairs
Manager – South America,
First Quantum Minerals



Production

Copper margins shrink as costs rise



Image courtesy of Anglo American

Peru's top 10 copper producers have remained consistent, but notable rankings have changed. Cerro Verde has now taken the lead as the primary copper producer, experiencing a 1.6% increase in output (466,463 mt/y compared to the 459,100 mt/y produced in 2022). In contrast, Antamina, which held the top position in 2022, saw a 7% decrease, from almost 468,000 mt/y to 435,378 mt/y.

Southern Peru maintains its third-place position, showing a significant 9.4% increase to 374,189 mt/y from the 341,898 mt/y produced in 2022. Anglo American's Quellaveco presented a 219.9% increase, becoming the fourth-largest copper producer in Peru, having produced 319,061 mt/y of copper. The mine was brought online in late 2022, so it must be noted that this uptick in production is logical, though crucial for Peru.

Las Bambas demonstrated a 18.5% increase, following a challenging first half of 2023, with operations picking up swiftly. The mine, operated by the Chinese MMG has produced 302,039 mt/y of copper in 2023 (vs 254,712 mt/y in 2022). On the contrary, Chinalco experienced an 18.1% decrease (200,317 mt/y in 2023 compared to 244,712 mt/y in 2022). The remaining companies in the top 10, namely Antapaccay, Marcobre, Hudbay, and Sociedad Minera El Brocal, also showcased positive variations.

This collective performance has propelled Peru to achieve a steady produc-

tion of 2.75 million metric tons, surpassing the Democratic Republic of Congo and securing its position as the world's second largest copper producer.

2023 witnessed a surge in copper prices, particularly towards the year's end. Globally, concerns arose about declining production due to lower grades and the suspension of activities at First Quantum Minerals' Cobre Panama mine. Additionally, indications of monetary policies in the US contributed to a depreciation of the US dollar. As a result, 2023 concluded with the average copper price at US\$3.89/lb. Despite favorable prices, which should encourage increased production and allocation of capital in exploration to replace depleting reserves, costs and inflation seem to be eating up profit margins.

To cope with the escalating demand for copper and preserve Peru's position as the second-largest copper producer, operators of the red metal had to implement several measures and initiatives to enhance efficiency in copper processing, all while grappling with rising operational costs. Javier del Río, Hudbay's vice president South America and USA, highlighted that the interplay between a looming supply deficit and challenges related to declining grades and depleting resources globally exerts pressure on prices. Rising costs further contribute to narrower profit margins despite the positive outlook for

"The operational landscape becomes more complex and expensive. Profit margins tighten, necessitating a focus on increased efficiency. In this environment, it is imperative to streamline processes and enhance operational efficiency to safeguard profitability."

Javier del Río,
Vice President South America
and USA, Hudbay Minerals



copper. "In this environment of heightened operational complexity and rising costs, it is imperative to streamline processes and enhance operational efficiency to safeguard profitability," he said.

At a global level, Hudbay acquired Copper Mountain in British Columbia and Rockliff in Manitoba, both in Canada. Additionally, in the US it advanced the Copper World Complex in Arizona to a pre-feasibility stage. Locally, Hudbay has invested significant efforts in its Constancia mine (with the Pampacancha Satellite deposit) to navigate socio-political complexities while operating within expected guidelines.

Constancia has a processing capacity of around and approximately 90,000 t/d and a recovery rate of around 84%. The copper company invested in Magnetic Aggregation equipment for ultrafine particle filtration and a system to accelerate bubble discharge to enhance copper and molybdenum recovery. It also explored the implementation of ore sorting technology, which not only improves copper output but also helps to reduce energy consumption: "We have invested in new technologies, such as ore sorting, following the experience of Copper Mountain, and we want to implement it in Peru. At Constancia, we employ machine learning

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"In Ariana, beyond the shift in tailings disposal, we have relocated dry tailings away from the controversial Trans-Andean tunnel. This adjustment aims to alleviate any perceived risks, all of which were properly addressed and mitigated in the approved EIA for the project."

Adolfo Vera,
President and CEO,
Southern Peaks
Mining



"Despite initial challenges, such as social unrest and protests, the situation normalized by mid-2023. We have since restarted activities at Corani, primarily focusing on infill drilling and additional metallurgical testing. We are evaluating test results and preparing to restart the financing process."

Eric Caba,
President and CEO,
Bear Creek Mining



in throughput modeling, achieving over 90% effectiveness in predicting mill events. This allows optimized metallurgical responses by anticipating mineral behavior from crusher discharge to the processing plant," concluded Del Río.

Adolfo Vera, president and CEO of Southern Peaks Mining (SPM) emphasized the need for "improving process efficiency and renegotiation terms with suppliers."

In 2023, SPM encountered challenges in meeting the projected budget for Condestable's production ramp-up, causing missed opportunities with the higher copper price. However, it recovered throughout 2023 to successfully meet the annual target: "As part of the renewal process of our EIA, we are including, among a few changes in some components, a production increase to 10,000 t/d. We are finalizing the technical details and drafting of the EIA for Condestable, which is set for submission during the first quarter of 2024," explained Vera.

In line with enhanced mining efficiency, SPM transitioned to a global approach, consolidating mineralized blocks into a single reserve block: "While this integration may lead to a loss of ore grade in some areas, the gained efficiency outweighs the drawbacks. This has boosted our in-situ resources to over 120 million tons of copper, narrowing them down to 70 million tons of resources and 40 million tons of reserves. This represents a substantial 25% increase from our previous reserves of 32 million tons," concluded Vera.

Precious Metals

In 2023, the precious metals segment witnessed record-breaking prices. Gold initially decreased after the Fed's attempt to control inflation but gained appeal as a safe haven asset due to geopolitical events and increased central bank reserves. The closing average price for gold in 2023 was US\$2,033.31/oz. Gold in Peru demonstrated a strong performance, with a 2.8% increase in gold production (3.1 million oz produced in 2022 vs 3.2 million oz in 2023).

The top performers in gold production for 2023 included Minera Yanacocha, leading the rank with a production of 275,681 ounces of gold, marking a significant 13.1% increase compared to 2022. Compañía Minera Poderosa followed closely, producing 269,518 ounces but experienced a slight decrease of 11.1% in its produc-

tion. Consorcio Minero Horizonte exhibited notable growth, with a gold output of 203,108 ounces, representing an 8.3% increase. On the other hand, Minera Aurífera Retamas saw a modest decline of 5.5% in gold output, yielding 196,503 ounces. Meanwhile, Minera Boroo Misquichilca demonstrated a remarkable surge, achieving a 68.7% increase in production, totaling 175,649 ounces. Lastly, Hochschild's Compañía Minera Ares faced a downturn, with a 13% decrease in production, reaching an output of 144,323 ounces.

In contrast, the silver segment experienced a slight dip of 1.3%, though less severe than the decline observed in 2022 (108 million oz in 2022 vs 107 million oz in 2022).

Despite facing challenges in early 2023 due to disruptions, Eduardo Landin, the new CEO of Hochschild Mining, commented that the company surpassed the reviewed production target, achieving a production of 300,749 oz of gold equivalent. A significant milestone for the company was securing approval for the Modified Environmental Impact Assessment (MEIA) for Inmaculada, enabling another 20 years of production with 262 hectares and 558 km of underground development.

Reflecting on gold prices and acknowledging the shrinking margins across the industry, Landin asserted that the company aims to be among the top cost quartiles to stay competitive, especially during price downturns. However, given the uncertain nature of gold price fluctuations, the company is preparing for both high and low-price scenarios: "To address this, the company implemented a 'Zero Cost Collar,' placing 100,000 oz of gold at a price range of between US\$2,000 and US\$2,252. If the price stays within this range, we receive the market price. If it falls below US\$2,000, we receive this guaranteed figure and if it exceeds US\$2,252, we receive the latter price. Although common in trading, this strategy is novel for the company and represents a proactive measure to manage exposure to the gold price, providing security in a fluctuating environment," explained Landin.

Buenaventura ranked as the 10th largest gold producer in Peru, and experienced a 3.9% increase in production, aligning with the projected guidelines for 2023, according to Leandro García, Buenaventura's CEO. Focused on the San Gabriel project, continuous efforts have resulted in noteworthy progress: "In San Gabriel, we concluded 2023 with engineering reaching 90%,



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procurement at 89%, and construction at 14%, contributing to an overall advancement of 28% by year-end. Additionally, we accomplished a CapEx of approximately US\$140 million in 2023, with expectations to invest around US\$200 million in 2024," García commented.

Buenaventura aims to complete construction at San Gabriel in 2025 and secure the first gold bar by the end of that year.

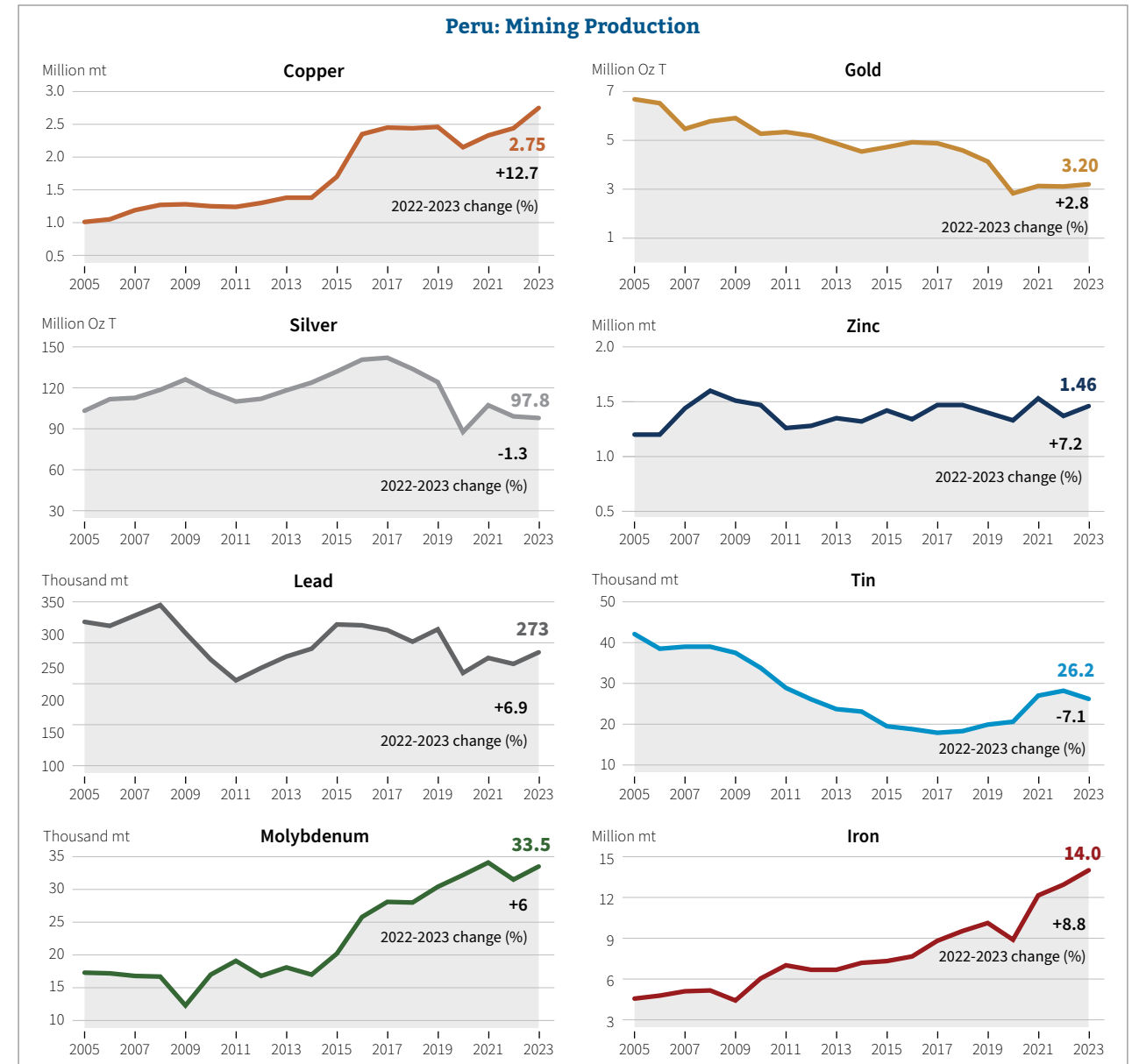
Base Metals

Regarding base metals, Peru's zinc production reached 1.47 million t/y in 2023, marking a substantial 7.2% increase compared to 2022 figures. Antamina continued to lead in zinc production, reaching an annual output of 527,979 metric tons, followed by Volcan at 171,117 metric tons and Nexa Resources at 84,710 metric tons. Antamina and Volcan both showed positive trends, with a 5.6% and 13.2% increase in production, respectively. However, Nexa Resources experienced a 6% decrease in its zinc production. Lead also demonstrated a robust 6.9% rebound in 2023, with Volcan, Nexa, and Compañía Minera El Porvenir emerging as the primary producers.

The zinc market dynamics were influenced by a combination of factors, including a sluggish post-COVID recovery in the Chinese economy leading to a drop in zinc prices, concluding 2023 on the LME at US\$2,650/t.

"Eight years ago, every zinc miner would have agreed to a long-term price of US\$2,500 per ton. However, costs have risen so much that this level does not seem sustainable for a large proportion of the industry in the long term."

Luis Herrera,
CEO,
Volcan



Source: Ministry of Energy and Mines (MINEM) / GBR

"We are still living in the throes of 2023. The measures adopted by China led to a sustained drop in zinc prices mainly, while silver was more stable. A drop of nearly US\$1,000/t of zinc since January 2023 is significant for the industry. As a producer of 250,000 t/y of fine zinc, it is one of the factors we are most sensitive to," commented Luis Herrera, the recently appointed CEO of Volcan.

Volcan remains a key player, having achieved remarkable silver production of nearly 15 million oz/y and 250,000 fine t/y of zinc. With the ambitious Romina project in the pipeline for Peru, the company anticipates significant growth in both cash flow and metal production, reinforcing its position in the industry: "Romina has a forecasted mine life of 14 years with a production rate of 50,000 to 70,000 t/y of zinc equivalent," commented Herrera.

Romina requires a US\$150 million CapEx, but first the company must ensure it has the necessary resources to execute the project on time.

While Romina remains the company's priority, Volcan has signed a JV with Antofagasta to explore prospective copper zones on the same trend as Toromocho: "The agreement has much potential, but there is a lot of work ahead of us and it entails significant investments in the coming years that could change Volcan's exposure to the metals it produces. We have a large package of almost 350,000 hectares in mining concessions that are highly prospective," added Herrera.

This joint venture represents the second strategic move by Chilean company Antofagasta in the Andean country. In December 2023, the gold producer Buenaventura revealed that Antofagasta had acquired an approximate 19% equity stake in the company. ■

Sustainable Synergy

Energy and waste disposal



"Wind energy is well developed in the northern and center part of Peru, while the south is one of the places with highest solar radiation in the world. This, combined with extensive mining activity, could position Peru a center of excellence in the development of green hydrogen."

Rosa María Flores-Araoz, CEO, Kallpa



"Unlike industries that may initially grapple with prolonged contracts, mining excels by not being hindered by these extended periods. By addressing initial challenges, we foresee that we will harvest future benefits of electromobility in mining, including emission reduction and lower energy consumption."

Alex Ascón, General Manager, Enel X Way Perú



"Initiatives like circularity have the potential not only to facilitate access to more favorable financing but also to secure additional recognition, excluding companies that do not align with sustainable practices. This commitment underscores the convergence between economic success and environmental responsibility."

Carlos Barrientos, Regional Director Andean Region and Mexico, Séché Group

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The Peruvian exploration portfolio has remained relatively stagnant over the past few years, and the latest document published by the MINEM in early 2023 (and updated in September 2023) includes 70 projects with a total investment of US\$521 million. Despite the millions of dollars in the pipeline, the total exploration budget executed in 2023 reached US\$42 million, indicating a modest 2.4% increase compared to the figures from 2022. As reported by the MINEM, 2023 saw the highest exploration figures of the last five years, representing the third consecutive year of growth.

The figures provided by MINEM do not distinguish between the investments made by junior and producing companies, making it challenging to discern which value chain segment has allocated resources to exploration activities. However, data from S&P indicates that in 2023, majors increased their exploration budget by 1.2% for their existing assets, while intermediates and juniors reported a decrease of 4.5% in their budgets in 2023 compared to 2022. This has resulted in the grassroots share of exploration falling to an all-time low of 23.4%. The lack of liquidity in the market and limited equity financing opportunities have placed financial strain on junior mining companies.

"Positive retail investor sentiment is returning. The more active the industry is from an exploration standpoint, the better it is in the long term for the country. Exploration is where value is created in the mining industry."

David Kelley,
President and CEO,
Chakana Copper



It is interesting to compare this situation with majors and mid-tiers, as they have capitalized on the favorable mineral prices in recent months, generating cash flow to fund exploration activities. However, these favorable mineral prices have not translated into a positive sentiment among inves-

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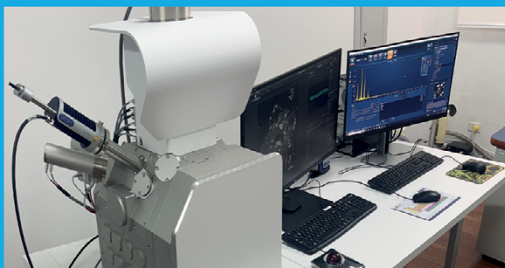
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tors, leading to a reluctance to allocate capital to junior mining companies.

Despite unfavorable market conditions, a company that made strides was Camino Corporation. In June 2023, Camino Corporation welcomed Nittetsu Mining as a partner for its Los Chapitos project, an IOCG (iron oxide-copper-gold) deposit. Nittetsu, a Japanese company, has invested CAD\$10 million over three years, which, according to Jay Chmelauskas, CEO and president of Camino Corporation, will propel the company's progress towards resource delineation and potentially a feasibility study: "We aim to establish multiple pits feeding a central processing plant for a prospective SX-EW copper oxide mine," commented Chmelauskas.

Reflecting on market conditions, Chmelauskas commented that the company's engagement with stakeholders like the Japanese Embassy, Canadian Embassy, and the MINEM reinforces the positive impact of foreign investment on Peru: "The consensus is that high-risk capital investment is crucial for making significant discoveries. Junior mining companies like ours often pave the way for larger enterprises to follow, contributing substantially to the overall industry investment," he concluded.

From a global perspective, the insufficient focus on exploration exacerbates the shortage of new projects, essential for the energy transition. McKinsey & Company forecasts that the demand for copper is projected to reach 36.6 million t/y by 2031. Compared with the projected supply, a substantial gap of 5.1 million t/y exists. According to David Kelley, president and CEO of Chakana Copper, there was already a supply gap for copper before the clean energy transition became a prominent topic. Additionally, other factors will contribute to copper fluctuation and Peru's attractiveness as a mining jurisdiction, like disruptions seen in Panama and copper grades decreasing in Chile.

Chakana owns the Soledad project in the Áncash region. In June 2023, Chakana received a permit to drill on the southern half of the project, enabling it to explore different types of mineralization, which include a porphyry target, referred to as Mega-Gold and a high-sulfidation epithermal style of mineralization called La Joya. Kelley, a geologist, explained that the mineralogy of the project is unique and the company wants to test the porphyry targets and the high-grade outcropping tourmaline breccia pipes: "We are in the Miocene mineral belt, one of South America's most prolific porphyry belts. There is no better place to make a tier-one discovery than to be in the vicinity of other world-class deposits," he commented.

Chakana expects to use CAD\$3 million recently raised for a 3,000-meter exploration drilling campaign at the Mega-Gold porphyry target in the first half of 2023.

DLP Resources is another junior company with its flagship project in the Miocene belt. The Aurora copper-porphyry project is in an advanced stage and was initially drilled by Bear Creek Mining in 2001. DLP acquired the project in 2021 and conducted deep drilling down to 1,000 m: "We commenced the current drill program in August 2022 with three drill holes. In 2023, we completed 10 holes in the project. In total, we have performed 9,910 m of drilling. We have a program in place for 2024 to drill 10 holes and 10,000 m," commented Ian Gendall, president and CEO of

"Juniors are more important in the present day for exploration than in the past. Moving forward, I believe we will see a lot more discoveries being made by juniors. Majors are going to rely on juniors as their exploration arm."



**Ian Gendall,
President and CEO,
DLP Resources**

DLP Resources. "We must go through a financing round to raise CAD\$4-5 million to complete the proposed drilling campaign to advance it to the point where it has a defined mineral resource by 2025".

Latin Metals is another Canadian company focused on copper, though with a different model from traditional juniors since it is a prospect generator. Keith Henderson, CEO and president of Latin Metals, shared that prospect generators are a longer-term investment: "It attracts those with a long-term view. Prospect generators have the potential to organically grow into royalty companies without diluting shares," he explained.

The company has two projects in Peru: Auquis and Lacsha. At Auquis, Latin Metals has identified multiple centers of mineralization for various deposit types, and aims to secure a partner for the property in early 2024. As for Lacsha, there is a 3-year community agreement in place along with a drilling permit: "It is truly partner-ready. Funding from a potential partner can be deployed almost immediately for drilling. This is advantageous because community agreements and drill permits can be difficult to acquire in some areas of Peru, and even the places where acquiring permits is ideal, securing them can still be time-consuming," stated Henderson.

From national to regional turmoil

In 2023, there was a prevailing perception that Peru was losing its opportunity in the energy transition, leading investors to explore alternatives in other jurisdictions. Interest was heading north to countries like Canada and the US, known for their robust rule of law and policies promoting the development of critical minerals such as copper. Others seemed to look to more regional options like Panama and Ecuador. Interestingly, due to twists of fate and socio-political changes, it appears that the opposite scenario is unfolding.

The current "calm" in Peru has outshined factors like narcoterrorism in Ecuador and the protests that erupted in 2023 against First Quantum's contract to operate the Cobre Panama mine. While potentially favorable for Peru in the short term, these events in Latin America may raise concerns among investors about the possibility of a long-term contagious effect.

Luquman Shaheen, president and CEO of Panoro Minerals, pointed out that Peru often faces misjudgments due to broader

regional perceptions. North American investors, in particular, tend to generalize their views of Latin American countries based on isolated incidents: "This tendency can create challenges for companies operating in Peru, like ours, as they may be unfairly associated with broader regional concerns. For example, the stigma of being painted with the same brush as Panama poses difficulties for us to overcome. However, many investors understand the nuanced nature of the exploration story in Peru and Latin America," he concluded.

What happened in Panama was a hard blow for the whole industry, but especially for First Quantum Minerals (FQM). This raises questions about how the Canadian producer will approach its two projects in Peru: Haqira and La Granja, a project in Cajamarca to be developed in a joint venture with Rio Tinto.

Jorge Benavides, legal and corporate affairs manager – South America at FQM, explained that Haqira marked FQM's initial entry into LATAM. However, the company prioritized Cobre Panama, allowing Haqira to progress cautiously. After a suspension period, FQM secured an access agreement with communities in the direct influence area by mid-2023. Since September 2023, the company has been drilling at the Haqira East deposit to enhance understanding of the deposit and to increase its volume.

Regarding La Granja, according to Benavides, the project boasts resources of 4.32 billion t at 0.51% copper and has significant expansion potential: "Our current focus is on an extensive two-year drilling campaign initiated in October 2023. This drilling

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campaign, geared towards improving geological, metallurgical, and geotechnical knowledge, will enable the upgrading of inferred resources, and their eventual conversion into reserves in order to allow the design of a mine plan," he added.

Reflecting on the looming copper shortage, Benavides commented: "Copper deposits are few and far between, and any easy projects are already in operation. In order to deliver the increasing amounts of copper that the world needs, we need to operate in increasingly complex environments that require more advanced technologies and techniques with consequently higher costs," concluded Benavides.

Regardless of their size, mining companies have plenty to risk, from reputation to millions of dollars in investments. Perhaps because of the complexity and intricacies of developing new mines, such as dealing with declining ore grades and navigating complex jurisdictions, we are witnessing more partnerships in various forms for developing future mines in Peru, exemplified by the JV between FQM and Rio Tinto.

Silver, always overshadowed by copper

Silver is an attractive commodity, yet overshadowed. On the one hand, it serves as a heaven during an economic crisis, but it does not exhibit the same interest as gold. On the other hand, it plays a crucial role as an industrial metal. However, it does not receive the same attention as copper, particularly in the energy transition context.

When discussing this with Peter Dembicki, president and CEO of Tier One Silver, he complained about silver being thought of only as a byproduct of copper production, adding that there are very few true silver producers: "Silver has outperformed gold by a large margin in the eight previous bull markets. When it is silver's time, it shines brighter and moves higher and faster than gold," he emphasized.

Like many junior companies, Dembicki explained that Tier One Silver has faced unfavorable market conditions, making 2023 a "humbling year" for the company, as it could not drill its Curibaya project. However, Dembicki asserted that Curibaya holds great potential: "The grades are unparalleled. In previous drill cycles, we achieved grades of over 300,000 g/t of silver and 980 g/t of gold, and over 80 samples with over 1,000 g/t of silver and 2.5 g/t of gold," he added.

"Historically, and due to the lack of legislation, lithium mining has been disregarded in Peru due to its association with rare earths and radioactive minerals.

This will require the use of advanced technologies and extraction processes."



Erika Gabriel,
General Manager,
Bizalab

Silver Mountain Resources is a more recent entrant into the Peruvian exploration segment, capitalizing on silver's fundamentals. Since going public in 2021, the company has been focused on rehabilitating the Reliquias mine in the Castrovirreyna district, with over 35,000 m drilled: "It will be an underground mine, and we are in the first phase of a two-stage strategy to revive Reliquias and commence operations at the Caudalosa plant, where we aim to achieve a daily production of 2,000 t/d," commented Álvaro Espinoza, CEO of the company.

From the Lithium Triangle to the Lithium Quadrilateral

Lithium has emerged as one of the hot commodities in recent years, listed as a critical mineral by many countries due to its significance in lithium-ion batteries for electric vehicles (EVs).

In LATAM, the focus is on the Lithium Triangle, an area shared by Bolivia, Argentina and Chile, which, according to different sources quoting the USGS, is thought to hold more than 50% of the world's lithium resources.

While suggesting that Peru could become a 'fourth point' in the lithium triangle, it is just a metaphor due to the hard-rock nature of lithium in the Andean country, as opposed to the brines found in Bolivia, Argentina, and Chile. However, Peru's lithium story is unfolding with the publication of a 2024 Preliminary Economic Assessment (PEA) for the Falchani project by American Lithium. The PEA, released in January 2024, increased the measured and indicated categories by 476%. According to this economic analysis, Falchani is projected to produce over 85,000 t/y of lithium carbonate: "We saw a tripling in NPV from the prior economic analysis; it grew from US\$ 1.5 billion to US\$ 5.1 billion, showing the scale and purity of the project. Operating cost will be approximately US\$5,100/t, placing it in the lower quartile of the global cost curve," commented Simon Clarke, CEO of American Lithium.

Following President Biden's passage of the Inflation Reduction Act (IRA), several reports indicate that lithium demand for the US energy transition will be 15% higher by 2035 than initially projected before the IRA. Despite the US making efforts to achieve lithium self-sufficiency with projects on the brink of production, it is suggested that the US will need to rely on allies. This holds particular significance for Peru, as both countries share a free-trade agreement, and the type of rock mined in Peru will not be shipped to China: "This makes it unique among hard rock deposits. Battery grade lithium products will be produced onsite at Falchani without the need for beneficiation overseas and reducing reliance on China for processing," concluded Clarke.

In addition to Falchani, American Lithium also owns the Macusani Uranium Project, another mineral not commonly found in Peru. Clark suggested that the escalating tensions between Russia and the West and a tightening supply from Kazakhstan, coupled with the world's shift towards the green transition, further emphasizes the increasing demand for uranium, which Macusani is poised to meet: "Our Macusani Uranium Project has a relatively simple flowsheet and low capex at US \$300 million. With the ability to produce 6-7 million pounds of U3O8 a year, this is a top tier asset that will significantly contribute to annual global uranium supply." ■

Engineering, Consultancies and Contractors

Ahead of the game

While strolling through the streets of Lima in the summer of 2024, one could not help but notice newspaper headlines announcing the regular breaking of temperature records. Conversations on the streets revolved around global warming and the impacts of climate change.

A combination of factors, including the El Niño phenomenon and the absence of the South Pacific Anticyclone, contributed to these unusual temperatures. Researchers argue that climate change has intensified its impact. Limeños were not wrong in noting that the climate is changing. This prompts the question of how Peruvian mining operations adapt and implement effective management strategies to address these changes.

In this context, consultancies and engineering firms are valuable allies for mining companies. When addressing the implications of climate change and the El Niño phenomenon, Guillermo Barreda, the general manager of Knight Piésold Peru, emphasized that relying solely on reactive measures is not enough: "In northern projects, it is crucial to factor in the impact of the El Niño phenomenon. This phenomenon, unique to this region, leads to excess water, a factor that all mining projects must incorporate into their planning. Addressing the El Niño effects should be a priority from the project's outset".

"The Hydraulic Dewatered Stacking (HDS) tailings disposal technology utilizes naturally generated sands during production. Beyond addressing reservoir volume reduction, this technology positively impacts capital costs by leveraging existing mine materials."



Gustavo Bravo, Mining Director for Latin America and the Caribbean, WSP



Gonzalo Covarrubias, Managing Director for Peru & Mexico, WSP



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Considering the potential negative impacts on production, mining companies cannot afford to postpone addressing the effects of climate change on their operations. As highlighted by Barreda, the challenge lies in the industry's recognition that the environmental aspect of operations goes beyond permit acquisition. A comprehensive risk assessment is necessary, along with the implementation of actions supported by the development of corresponding models and designs: "Instead of reactive measures, like determining the location of the main mine infrastructure, it is advisable to adopt preventive solutions," he concluded.

Comprehensive risk assessments and forward-thinking strategies are paramount, requiring the integration of a holistic vision. WSP has been working on this through its Future Ready Program, a methodology that analyzes diverse trends and variables like climate change, society and technology, emphasizing their impact on projects. "Our focus extends beyond green energies to include aspects like constructability, the complete lifecycle of assets, closure plans, and mining infrastructure, ensuring a holistic and sustainable vision," commented Gonzalo Covarrubias, managing director for Peru and Mexico of WSP.

Balancing costs on tailings

While northern Peruvian mining operations may have to cope with challenges related to excess water, climate change is also expected to cause droughts. In January 2024, the Centro Nacional de Estimación, Prevención y Reducción del Riesgo de Desastres (CENEPRED) identified 277 districts at very high risk of water stress. Notably, most of these districts are key hubs for mineral production in Peru. Considering a less optimistic future for water, mining companies are actively working to reduce water consumption, particularly in tailings, by shifting from traditional methods to drier alternatives to achieve both enhanced risk management and decreased water usage. Additionally, companies worldwide are aligning with the Global Industry Standard on Tailings Management (GISTM), introduced in 2020, and following recommendations from the Canadian Dam Association.

Dan Etheredge, VP of South America at Klohn Crippen Berger (KCB), emphasized that tailings regulations have undergone significant changes, becoming more complex and stringent. However, mining companies seem willing to go the "extra mile" in prioritiz-

"While the mining industry is moving towards integrating renewable energy into its lifecycle, widespread adoption is not yet evident. Such solutions are crucial in addressing the multifaceted issue of climate change, necessitating measures across all aspects of mining activity."

Guillermo Barreda, General Manager, Knight Piésold Peru



ing safety. "After recent tailings dam failures, they understand the impact of not making the effort to exceed regulatory standards, which has led many clients to take a more conservative approach," said Etheredge. "In the past, filtered tailings used to be discarded almost immediately due to the increased cost. That has changed over the last few years, with the increased cost included in the economic evaluation of the project. There are more projects with filtered tailings," he added.

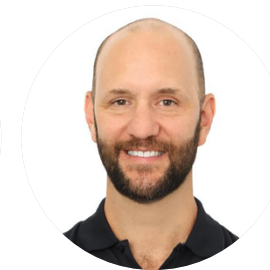
Mining companies must find a delicate equilibrium between profitability and maintaining impeccable environmental standards. This balance is essential for fostering positive relationships with local communities and ensuring access to capital allocation. Gustavo Bravo, the mining director for Latin America and the Caribbean - WSP, highlighted that technological advancements have made new solutions more cost-effective, and explained that WSP is introducing Hydraulic Dewatered Stacking (HDS) for tailings disposal, a technology that efficiently reduces water content by layering tailings and naturally generated sands in mining. "Beyond addressing reservoir volume reduction, this technology positively impacts capital costs by leveraging



Guillermo San Miguel, CEO, AESA



Eduardo Cossio, CEO, INCIMMET



Rafael Ríos, Country Manager, Construplan

existing mine material; sand. This approach provides a notable economic advantage compared to conventional technologies like press filters," explained Bravo.

However, the mining industry is resistant to change. "The culture in the mining industry can be characterized by the phrase "I want to be first to be second." The industry tends to avoid risk and remains somewhat resistant to unproven initiatives," commented Paul Murphy, Mining Plus' South American office manager.

Murphy notes that this trend is gradually changing and mining companies exhibit a growing appetite for research and development: "In some cases, there are signs of a

more flexible contracts and procurement process that accommodates innovators who may not align perfectly with traditional procurement requirements," he concluded.

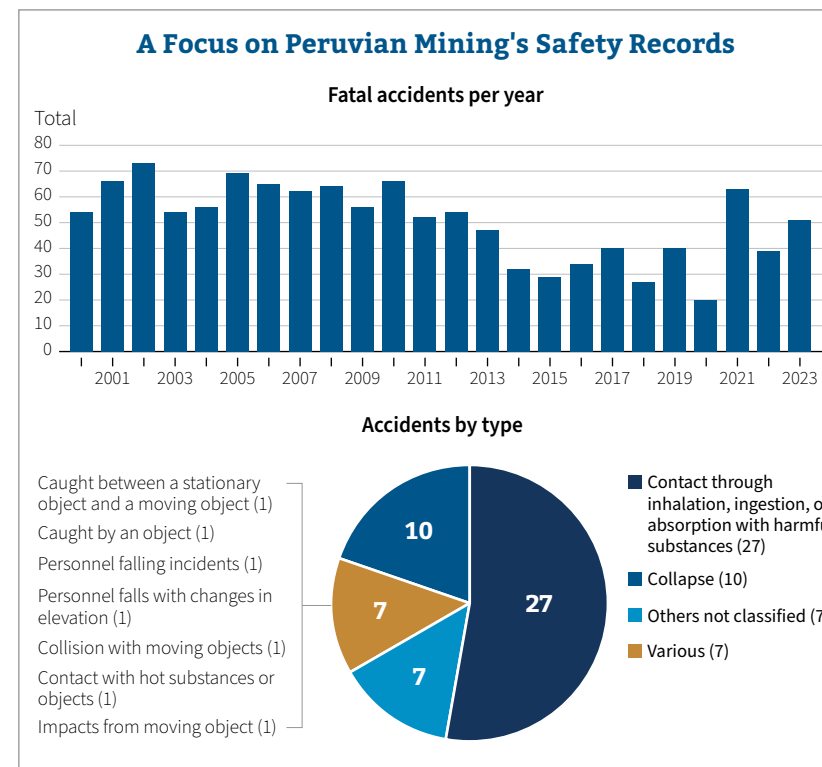
Underground contractors, a focus on safety

While open pit operations currently dominate the Peruvian landscape, there is an imminent shift towards underground mining. The declining ore grades and the environmental footprint of open-pit operations will drive the industry's transition to underground operations. For example, Antamina, the leading silver and zinc producer and the second-largest copper producer in Peru, is poised to transition to underground mining in 2031, start production in 2036, and reach full capacity by 2039.

In this context, underground contractors are striving to secure the limited bids available for current brownfield projects and analyzing how to enhance security in an underground setting. The challenging underground environment and corrosive conditions make implementing technologies to improve safety and health more difficult.

AESA, a Peruvian underground contractor, achieved a 15% revenue growth in 2023 compared to 2022 despite the intense competition in the segment. Guillermo San Miguel, AESA's new CEO, attributes this success to the company's close relationships with its clients, which enabled it to renew its contract with Chungar in July 2023 for another four years.

To enhance AESA's safety measures, the company strongly emphasizes training and an integration process for personnel. The company implements innovative technologies like virtual reality and simulators to improve operator training.



When asked about the value of automation, San Miguel responded that while they are currently observing trends in this area, including remote operations, their primary focus is on automating the management of data generated by mining equipment: "Our goal, in the near future, is to automate data collection to better understand equipment performance and optimize its operation. Once this process is established, we can identify improvement opportunities and develop business cases with our clients," concluded San Miguel.



Luis Flores,
General Manager, MUR

Another established underground contractor is INCIMMET. Eduardo Cossio, INCIMMET's CEO, informed GBR that in February 2023, it closed another contract to provide Compañía Minera Raura with comprehensive services for Cemented Rock Fill (CRF). Regarding safety, INCIMMET has won an acceleration process for the FreeRocks technology in Chile: "FreeRocks is a system that utilizes a drone, a thermal camera, and an advanced intelligent algorithm to predict and prevent rockfalls in underground mines. Our technological developments, made in-house, are in the process of obtaining patents to make them available to the entire industry across various countries," said Cossio.

The latest MINEM statistics show no consistent trend in the annual number of fatal mining accidents over the past few years.

2020, there was a minimum, likely due to pandemic-related mining restrictions. In 2021 incidents increased to 63, then decreased to 39 in 2022, and rose again to 51 in 2023.

Contractors must leverage new technological advancements, prioritize safety culture, and learn from previous incidents to prevent future ones.

The nexus between operators and local communities

Open pit is the king in Peru. Operations like Antamina, Las Bambas, Cerro Verde, Toquepala and Quellaveco are the big ones that fuel the economy. These operations also serve as a lifeline for a significant portion of the Peruvian mining service sector. In the absence of greenfield operations, contractors face pressure due to various factors, including a mature market and intense price competition.

John Tamayo, executive vice president of STRACON, highlighted the importance of contractors in fostering positive relationships between operators and the local community. This is particularly crucial, considering Peru's experience in managing and balancing mining goals with the expectations of local communities: "We help our clients create social peace. We do not feel that it is an obligation, but rather a duty, because one of our purposes is to continue building responsible and sustainable mining, integrating all stakeholders, and generating the greatest benefit for society," concluded Tamayo.

In the same line as Tamayo's perspective, Luis Flores, the general manager at MUR, a contractor focused on open-pit operations, acknowledged the substantial challenge in the industry concerning social responsibility. In response, MUR has implemented an outreach plan, integrating communities into its operations: "We strongly advocate for close collaboration between mining companies and contractors as a pragmatic and streamlined method to foster positive relationships with local communities. Contractors are now recognized as vital stakeholders committed to efficient operations and the sustainable development of impacted communities," added Flores.

While many Peruvian companies expanded into other jurisdictions, seeking regional stability, Construplan, a Mexican contractor, placed its bet on Peru: "Construplan has made a long-term commitment to Peru, as reflected by our investment in our Peruvian branch. This commitment remains steadfast regardless of macroeconomic and political situations somewhat beyond our control," commented Rafael Ríos, Construplan's country manager.

The company secured its first contract in Peru in 2023 with Nexa Resources' El Porvenir mining unit. Furthermore, Construplan obtained a contract for a 1.5 km crest channel in Atacocha as part of Nexa's 'Integración Project,' which integrates both operations into one cohesive initiative.

It was the right call to bet on Peru considering its specialization in open-pit mining. In February 2024, Mexican President Andrés Manuel López Obrador introduced a series of constitutional reforms to the parliament, including a proposal to amend Article 27 to prohibit open-pit mining. ■

Mining Equipment and Services

Green and autonomous solutions empower a diversified talent pool

Mining operates as an intricate orchestra, where every piece of equipment plays a distinct role akin to instruments in a symphony. Like a discordant note in music, a malfunctioning component can lead to catastrophic consequences in mining operations. Therefore, OEMs have been developing close ties to their partners, not clients, listening to their needs and working to improve operations. Technological strides are continuously reshaping the landscape.

After the Paris Agreement, mining producers, especially from copper, have a dual obligation: provide the red metal for the energy transition and adopt green mobility solutions to become net-zero by 2050. Simultaneously, the forefront is dominated by automation and predictive analysis to prevent "surprises" and enhance overall workforce safety conditions.

In this context, 2023 proved to be transformative for the main OEMs in Peru. With the appointment of Alfredo Bertrand as the new general manager of the Andean region, Epiroc entered a period of reassessment, aiming to explore the company's potential. Bertrand has gained valuable experience working in Argentina and Mexico. "Upon returning to Peru, I encountered a mining sector amid modernization, with a growing demand for cutting-edge equipment. Several mines are contemplating the automation of their hauling fleets. If this transition is successful, the potential for suppliers like us will double overnight," he said.

Automation not only enhances safety but also has the potential to broaden access to the female talent pool. In Peru, females currently represent only 7.1% of the mining workforce. "Geotec and Las Bambas announced the creation of the first all-female drilling team, made possible by Epiroc's equipment. Several explo-

ration companies want to introduce new automated equipment to form female work teams. We are also in discussions with an exploration company undertaking work similar to that of Las Bambas," commented Bertrand.

On the other hand, battery-powered equipment is a hot topic, primarily due to its notable benefits in energy efficiency and improving workers' health conditions, particularly in underground operations. However, Sandvik's general manager, Armando Sugobono, noted that no Peruvian clients have adopted Sandvik's battery-powered equipment. The smaller size

"Compact self-transportable equipment facilitates reaching remote locations, meeting environmental and mining safety standards. We operate eight units under this approach and aim to double this number by the end of 2024."

Jorge Granda, COO,
AK Drilling



of underground mines in Peru, around 3x3 meters, is cited as a critical factor, in contrast to larger mines in other jurisdictions measuring 6x6 meters: “There are only two mines in Peru — Cerro Lindo and El Brocal— that can fit this size of equipment. Sandvik is working to complement its technology and battery-powered equipment portfolio across the entire size range and market, but it is a gradual process,” he explained.

Like Epiroc, in 2023, Komatsu-Mitsui Maquinarias del Perú (KMMP) underwent a leadership change, with Julio Molina appointed the new CEO. The company achieved notable sales of US\$650 million, attributing a portion to a substantial contract with Antamina. Under this multi-million-dollar, year-long agreement, KMMP will supply 20 Komatsu 980E-5SE trucks with Cummins QSK95 engines. The initial order of 10 trucks will be delivered in Q1 2024, with the remaining eight scheduled for delivery in the 2024’s second half.

Molina noted that brownfield projects drive demand, focusing on the energy transition, fleet automation, and digitalization: “The energy transition and mineral demand drive brownfield expansions. Key clients such as Cerro Verde, Southern Peru, and Las Bambas focus on increasing production and exploring new technologies. The current mining landscape is defining its future, addressing decarbonization goals, and meeting the global aim of carbon neutrality by 2050,” concluded Molina.

Like other OEMs, Scania sees the future in electromobility and women’s empowerment. Its Women Drivers Program trained 12

women as Scania bus experts, with plans to expand to trucks in 2024. Despite Scania’s electric solutions in Mexico, Colombia and Brazil, Peru faces challenges in adopting electromobility due to operational realities and government requirements, as noted by Eronildo Barros, Scania Peru’s managing director: “In Peru, adopting these solutions relies on a collaborative commitment involving us as providers, the government, and infrastructure stakeholders. While anticipating nationwide adoption, considering the available energy matrix, we present alternatives such as natural gas, emphasizing the potential of biomethane and biogas in the Peruvian context,” he concluded.

Specializing in hydraulics, Bosch Rexroth recognized a niche in electromobility with its eLION portfolio. General manager, Kai Rothgiesser, noted that Bosch Rexroth is collaborating with two Peruvian manufacturers on building two prototypes: “We remain hopeful of announcing the system’s operation during Expomina if all plans proceed as expected,” he concluded.

Material handling and wear parts

Conveyors are crucial in carrying materials from the mine to the processing plant and downtime can result in significant financial losses. In this context, conveyor belt providers are focusing on preventive and predictive maintenance. Fernando Barrio, general manager of Tecnomina, commented: “Clients recognize investment in predictive solutions as an effective means to avoid unplanned shutdowns, shifting the focus from corrective to predictive and preventive measures and anticipating potential issues in the medium and long term,” he explained.

Tecnomina has service contracts within mines in Southern Peru and at Anglo American’s Quellaveco and offers dynamic radiography for steel cable conveyor belts and electromagnetic scanning. Both methods eliminate the need for traditional inspections with operators near the belt. While the second option is more economical, it provides slightly less detail. “Clients can choose the machine based on their budget and schedule the scanning frequency, whether periodically or twice a week,” added Barrio.

Roxana Burgos, the general manager at Movitecnica, echoed Barrio’s thoughts: “The industry’s growing receptiveness to such technologies mirrors a paradigm driven by safety, efficiency and informed decision-making considerations.”

“A paradigm shift is underway, with initiatives gaining traction and major mining companies formally requesting their suppliers to submit carbon-neutralization plans. This approach is particularly relevant for larger mining companies, aligning with their internal sustainability goals.”

Kai Rothgiesser,
General Manager,
Bosch Rexroth Peru



Fernando Barrio,
General Manager,
Tecnomina



Roxana Burgos,
General Manager,
Movitecnica



Daniel Bacigalupo, Managing Director Spanish Speaking Latin America, Weir ESCO

Although Movitecnica was initially renowned for its crane services, it has significantly expanded its presence in the conveyor belt segment over the past few years, currently working on operations across Southern Peru, Chinalco, Anglo American’s Quellaveco, Minera Poderosa, Buenaventura, and Antamina.

Whether it is the shovels at the beginning of the process or the milling equipment at the end, all the equipment requires durable wear parts to ensure an extended lifespan. In this segment, we find Weir ESCO, part of the global Weir Group. Daniel Bacigalupo, managing director – Spanish speaking Latin America at Weir ESCO, commented that the company introduced Motion Metrics, an AI system applied to machines for detecting operational issues: “The system provides granulometric metric profiles, boulder detections, volumes efficiencies and other applications in various areas like loader, trucks, conveyor belts, and blasting. This AI technology captures images, processes them through the CPU, and transmits alerts and information to the cloud, delivering essential real-time data on wear parts within other KPIs,” explained Bacigalupo.

Improving flotation

Companies want to optimize mineral recovery to extract every last milligram of minerals. This pursuit not only enhances the overall recovery process but also results in the generation of smaller tailings. For instance, Anglo American is constructing a Coarse Particle Recovery (CPR) plant at Quellaveco. This will allow the company to recover more copper without additional water since it would be recycled from the same tailings.

While CPR has garnered recognition for its efficacy, the flip side of this involves the intricate challenge posed by ultra-fine particles. Metso has been leading the way in this regard. One of the company’s recent innovations is the Concorde Cell Technology, specifically designed for the flotation of fine particles: “Challenges arise with tiny clay minerals, such as those measuring 5 microns, which are difficult to float without applying fine and ultra-fine flotation. This becomes particularly valuable in recovering minerals previously lost in tailings, potentially resulting in a 3-4% increase in production with significant economic value,” explained Fernando Samanez, VP and head of minerals sales in South America at Metso.

Laboratories

Henry Luna, the president of the Ingemmet (Geological, Mining, and Metallurgical Institute), explained that in December 2023, Ingemmet created the Metallogenic Map of Peru to identify copper, gold and lithium zones, which specified that while the coastal and mountain areas contain lithium, the highest values are found in Puno.

Peru is well known for its copper endowment, and its deposits are well mapped since the 50s. However, as Falchani’s lithium story unfolds, the question arises: Has Peru been overlooking lithium? According to Erika Gabriel, general manager of Bizalab, a laboratory specialized in mineralogy tests: “New opportunities are emerging in the Peruvian lithium sector. For example, Macusani Yellowcake

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recently received an exploration permit in an area with evidence of lithium resources. Historically, and due to the lack of legislation, lithium mining has been disregarded in Peru due to its association with rare earth and radioactive minerals. The main presence of lithium in Peru differs from other countries in the region, since it is hosted in micas such as zinnwaldite and lepidolite, and also in clay minerals (smectites), and zeolite. This will require the use of advanced technologies and extraction processes. Historically, and due to the lack of legislation, lithium mining has been disregarded in Peru due to its association with rare earth and radioactive minerals. The main presence of lithium in Peru differs from other countries in the region, since it is hosted in micas such as zinnwaldite and lepidolite, and also in clay minerals (smectites), and zeolite. This will require the use of advanced technologies and extraction processes.”

Bizalab has been analyzing lithium samples for a junior company, and according to Gabriel, the samples are completely different from the minerals they usually analyze. This makes the company grow: “The study of lithium requires different approaches and concepts, leading our team to develop new skills and knowledge in this area.”

Another company, not a laboratory but specialized in meshes and metalworking, that envisions a promising future for lithium in Peru is Arenas: “The mining sector in Peru foresees a surge in lithium exploitation projects due to abundant reserves in our territory. Arenas is proactively researching key parameters for manufacturing products aligned with optimal lithium classification,” commented Gustavo San Martín, general representative of the company. ■



GLOBAL BUSINESS REPORTS

Peru Mining 2024

PDAC Pre-Release Edition

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