



# GLOBAL BUSINESS REPORTS

PERU  
MINING  
2022



Pre-Release Edition



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# Mining Under a New Political Era

*The industry rebounds after the pandemic, but a lack of clarity in mining policies hinders investments*

In July 2021, the socialist candidate Pedro Castillo emerged as the winner of Peru’s presidential elections, after an extremely tight and polarized contest against conservative rival Keiko Fujimori. The Peruvian mining industry was concerned by Castillo’s accession to power as he had vowed to tear up Peru’s decades-old constitution, take up to 70% of profits from mining companies operating in the country and introduce new royalties on mineral sales.

Castillo’s election in Peru can be considered as part of broader Latin American trend, where the political left is making a resurgence after the number of people living in poverty in the region rose by 22 million between 2019 and 2020, according to the Economic Commission for Latin America and the Caribbean (ECLAC). However, the return of the left is not surprising given the left-right pendulum in Latin America’s political landscape. “I believe that the current left-wing cycle will not be as severe as previous ones, since Peru today is a more mature jurisdiction and has stronger institutions,” argued Fernando Pickmann, partner at the multinational law firm Dentons.

There is indeed a system of checks and balances in place today limiting the president’s ability to keep his most radical promises such as the expropriation of mining companies. Specifically, the Congress, which was elected during the first round of presidential elections in April 2021, is made up by a majority of parties that favor the market economy and private investment as the main drivers of the economy. There are other reasons why expropriation did not seem like the right move for Castillo’s administration in the end. “In 2021, mining companies reached an all-time high in tax and canon payments, further discouraging the government from expropriating or increasing its control over mining companies,” stated Antonio Samaniego, director at SRK Consulting Peru. (The mining canon is a system whereby 50% of the income tax is paid to the municipalities and regions in the areas of operations.)

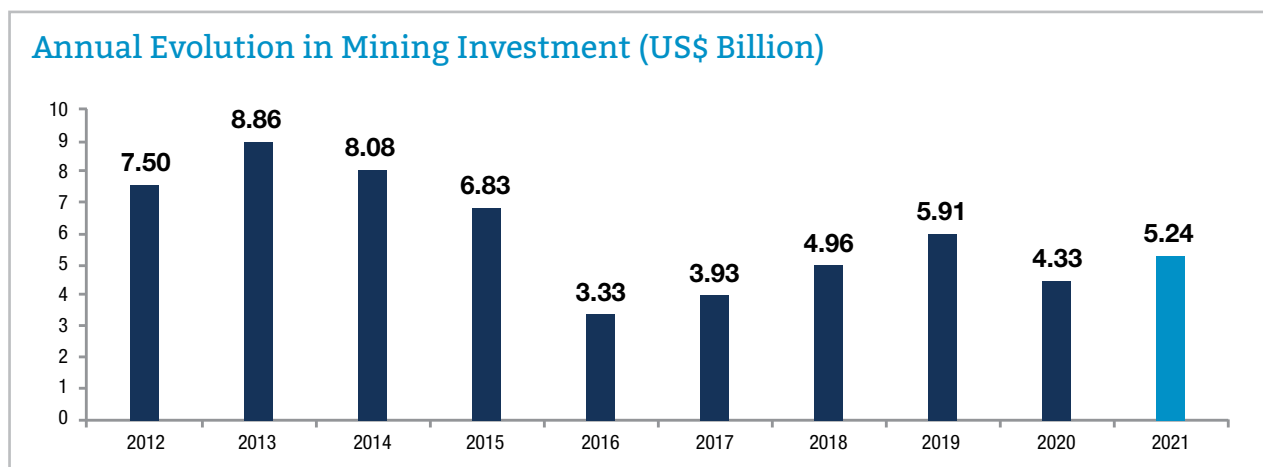
In the months that followed President Castillo’s election the mining sector’s alarms faded, as many of Castillo’s initial threats did not turn into reality, but the industry has nevertheless suffered from political

instability and the administration’s unpredictable stance on mining. Even so, Peru has experienced one of the world’s fastest post-pandemic recoveries. 2021 turned out to be a year of unprecedented growth for many companies across the mining value chain. Mining producers started making up for lost time after the easing of restrictions and encouraged by soaring metals prices. This has brought tremendous opportunities for service, equipment and technology providers. The Peruvian mining sector attracted investments around US\$5.24 billion in 2021, representing a 21% increase with regards to the previous year.

## Social conflicts intensify

Protests and social conflicts have been a long-standing obstacle to mining operations in Peru, and there has been an uptick in their prevalence since the second half of 2021. This is triggered by a recipe of greater inequality caused by the pandemic, perceived unfairness of substantial miners’ profits amid high commodity prices, and the president’s strong rhetoric in favor of a greater redistribution of revenues from natural resources and of holding miners accountable for environmental damage.

One of the most prominent examples of conflict between mining companies and local communities is that of MMG’s Las Bambas. The Chinese-owned copper mine has been particularly vulnerable to community protests in the last year and was forced to suspend operations in December 2021, as discussions to remove a road blockade set up by the Chumbivilcas community were unsuccessful. Protestors demanded greater social spending on the development of communities around the mine and the classification of Chumbivilcas as an area of direct influence, as well as the addressing of the environmental impact of the dirt road used to truck copper concentrates. According to MMG, the restrictions to inbound and outbound logistics caused by the roadblocks resulted in the mine running out of critical consumables.



Source: Ministry of Energy and Mines (MINEM)

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While the social protests at Las Bambas have been dominating the headlines in recent months, it is certainly not the only example. Operating mines such as Glencore's Antapaccay and Antamina (a BHP-Glencore-Teck-Mitsubishi joint venture) have also been experiencing important protests, as communities demand more infrastructure and economic development spending or ask for compensation for alleged environmental and social damages. In addition, several large projects in Peru's pipeline have been unable to progress due to perpetual waves of social protests, like Southern Copper's US\$1.4 billion Tía María copper project.

These examples show that developing a project to the stage where it has all necessary permits as well as the social license to operate is a very tedious and delicate process, but it is just the start. Once the mine is in production, whole new sets of questions arise in terms of how to design the social strategy in the area of influence. As reflected by the conflict at Las Bambas, defining the area of influence itself is one of the biggest headaches for companies operating in remote areas.

Today, the levels of the contribution of the mining industry to the national economy speak for themselves. According to the Peruvian Ministry of Energy and Mines (MINEM), the mining industry is responsible for 227,407 direct jobs. MINEM also issued a report stating that regional and local governments saw an aggregate 60% increase in mining tax revenues in 2021. According to the ministry, proceeds from the mining canon, legal and contractual mining royalties, rights to operate and penalties together added up to US\$1.68 billion last year, up from the US\$1.059 billion registered in 2020.

Yet, the Peruvian society's perception on the impact of the mining industry is alarming.

"One of the pending tasks in Peru is to ensure that the mining industry's contribution to the government through taxes and through increased employment reaches society through quality investments," expressed Víctor Gobitz, president of the Peruvian Institute of Mining Engineers (IIMP).

### Declining investor sentiment

Despite copper trading above US\$4/lb, the future of Peru's mining industry can be seen as worrisome, as political instability, combined with an expected tax increase on mining firms in 2022 or 2023, and the proliferation of social conflicts, are likely to dampen investor sentiment. Peru's Central Bank forecasted a lack of growth in private investment for new projects in 2022. However, the

country is still expected to see considerable opportunities arising from an 8% increase in brownfield investments to advance existing projects through different stages and to expand their capacity. According to MINEM, Peru still has a large pipeline of mining projects amounting to approximately US\$53 billion, even though many of the projects in that pipeline look very unlikely to see the light anytime soon.

In 2021, the construction of Anglo American's Quellaveco project led the country's investments with 25% of the total, and in 2022, additional investments are expected to be made in order finish construction and start ramping up operations.

In addition, MINEM expects seven projects to begin the construction phase in 2022. These projections may be a little optimistic according to a recent Scotiabank report. The bank executives believe that just three of the seven projects will proceed in 2022 for a total investment of US\$845 million. These projects include Corani, a US\$579 million silver project owned by Bear Creek, a US\$130 million investment for Chalcobamba phase I at the Las Bambas copper mine, and a US\$136 million Inmaculada optimization by Hochschild.

*"Today, Peru's Congress and other democratic institutions are preventing the executive branch from implementing radical policies."*

**Fernando Pickmann,**  
Partner,  
Dentons



If Peru is to take advantage of thriving copper prices, it is evident that it will need to navigate political uncertainties and overcome social problems, focusing more than ever on establishing excellent relations with local stakeholders. Today, investors are following closely how Quellaveco manages to transition into the production phase and how it is able to overcome all of these challenges. Depending on the outcome, it could potentially change the outlook of the Peruvian mining industry and attract other large-scale investments into the country.

Similarly, Newmont's recent investment in the mega-project Yanacocha Sulfuros could also improve the perception of Peru as a mining country, demonstrating confidence

in the world's second-largest copper producer amid political instability.

Moving forward, however, many industry players believe that the political context might soon experience some major changes. "We sense that in the coming months, the government will either recapititate or end up being impeached," predicted Antonio Samaniego, director at SRK Consulting.

President Pedro Castillo already survived an impeachment attempt in Congress in December 2021, two weeks after a group of right-wing parliamentarians first presented the motion citing corruption allegations. If Castillo's government continues to be characterized by persistent scandals, it is likely that the opposition will end up finding successful motives for his removal. ■

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# Mining Production

## *Social conflicts hinder developments and production*

Peru experienced one of the world's fastest post-pandemic recoveries, as its economy grew by 13.3% in 2021, rebounding from an 11.4% contraction in 2020. A large part of this recovery was fueled by Peru's mining industry, which emerged strongly after the severe lockdown was lifted and operations were allowed to restart with strict health protocols in place.

Peru's production of all metals grew enormously between 2020 and 2021, encouraged by thriving metal prices and a looming deficit of copper. However, if a comparison is made between the levels of mining production in 2021 and pre-pandemic levels, there are some substantial variations across different commodities. The production of base metals including zinc, tin, molybdenum and iron grew significantly against 2019 levels, whereas the

production of silver, copper and lead experienced moderate drops.

Gold was undoubtedly the most affected commodity, as its production decreased by nearly 25% between 2019 and 2021 according to MINEM figures (the industry recorded 3.11 million troy ounces (oz) last year, which is higher than the 2.83 million oz from 2020 but is still well below 2019's 4.13 million oz). The precious metal has already been struggling for almost two decades, as it reached peak production in Peru in 2005 with 6.68 million oz, and has not managed to return to those levels since.

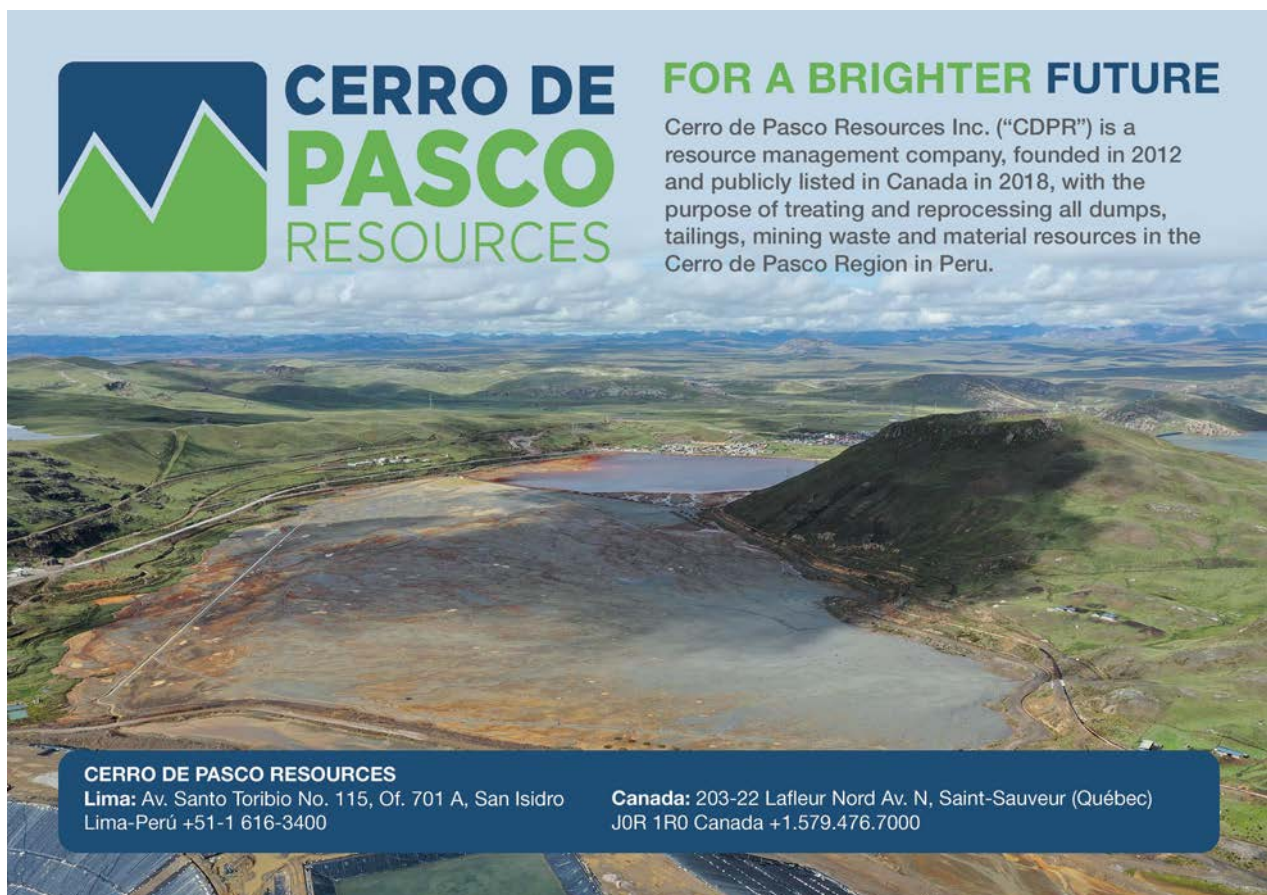
To a certain extent, Peru is mimicking a global downward trend in gold production, as major gold companies worldwide are running out of reserves and grades are progressively becoming lower. This said, in recent years Peru used to sit consistently


as the world's sixth largest producer, and in 2021 it was only the world's tenth largest gold producer according to USGS data.

### Investment pipeline

Total mining investment in Peru has not changed drastically in the past two years, going from US\$5.9 billion in 2019 to US\$4.3 billion in 2020 and US\$5.2 billion last year. This can be mainly attributed to the fact that large mining companies are currently investing in the expansion and optimization of their projects.

However, there were two new major projects in 2021. One of them was Anglo American's Quellaveco copper project, located in the Moquegua region, which represented 25% of all mining investment in Peru last year. The project is well on track





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*“Newmont will always remain a gold miner, but copper and gold produced together will go hand in hand as a very important metal for decarbonization, along with a very important metal in terms of a store of wealth that improves lives.”*

**Tom Palmer,  
President and CEO,  
Newmont**



to achieve first production in mid-2022, in line with the original project schedule despite the challenges presented by the Covid-19 pandemic to date. 2021 saw the achievement of several major milestones and, as of February 2022, construction on all work fronts is reaching the final stages. The Vizcachas Dam – part of the infrastructure that will provide water to both the operation and local communities – is now commissioned and turned over to the operating team, and the 95 km water pipeline to site is on track to completion in the first quarter of 2022.

In the mine, pre-stripping started in April 2021, with the moving of 24 million metric tonnes (mt) last year, and first ore was reached and excavated in October. The majority of the mine equipment fleet is now assembled, Quellaveco being the first operation in Peru to use fully automated haul trucks and drills.

Significant progress has been made on the primary crusher, with commissioning due to begin in the first quarter of 2022. The overland ore transport conveyor belt to the processing plant is being installed following completion of excavation work in

the tunnel section of the conveyor route. The other new project in 2021 was the expansion of Chinalco's Toromochu, a porphyry copper deposit located in the districts of Morococha and Yauli. Being one of the most important polymetallic deposits in Peru, it is currently working to expand the daily processing capacity of the mine from 117,000 mt/d to 170,000 mt/d. The expansion is expected to add 75,000 mt of fine copper per year, in addition to creating 3,200 construction and 2,400 indirect operational jobs.

However, the stable trend in investments seems bound to change. There is already a shortage of greenfield projects on Peru's horizon due the current political instability and abundant social conflicts in the country.

In the coming years, the only new large mining projects with a capex above US\$1 billion, are Newmont's Yanacocha Sulfuros, Zafranal, and Southern Copper Corporation's Los Chancas and Michiquillay projects. However, realistically, Yanacocha Sulfuros is the only project that is close to the construction stage, while the pos-



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sibility of putting Zafranal, Los Chancas and Michiquillay into construction seems much further away.

In Peru, there is a persisting feeling that the country could produce a lot more than it currently does. Multiple large-scale projects remain undeveloped due to permitting complications and community conflicts, such as Conga or Tía María.

### Copper production

In 2021, Antamina took Southern Copper Corporation's spot as Peru's top copper producer, increasing its output to nearly 460,700 mt/y, a 16.3% year-on-year increase. Closely behind, Cerro Verde, the mine operated by Freeport McMoRan in Arequipa also increased its production by 7.9%, yielding 418,600 mt/y in 2021. Southern Copper Corporation came in third with a combined 398,400 mt/y from its Toquepala and Cuajone mines, a 6% year-on-year decrease.

Las Bambas, operated by MMG, remained as the fourth largest copper producer with 290,106 mt/y. However, it suffered a 7.2%

*"We will ramp up operations at Condestable to reach the extended mill capacity of 8,400 mt/d in the second trimester of 2022."*

**Adolfo Vera,**  
President and CEO,  
Southern Peaks Mining



decrease compared to 2020 due to the community roadblocks and the consequent shutdown of the mine in December for approximately two weeks.

Beyond the large-scale miners, booming copper prices have also encouraged mid-sized copper producers to expand their operations and enhance exploration activities around their mines. This is the case of Southern Peaks Mining (SPM), which has continued with expansion work at its Condestable mine in the Cañete province. The company recently finished testing a new mill and will soon start ramping up operations to reach the extended capacity of 8,400 mt/d in the second quarter of

2022. "This will represent an increase of 12-15% in copper output compared to the previous year," explained president and CEO Adolfo Vera.

SPM has also undertaken actions to modify its Environmental Impact Statement and expects to request authorization to enter the second stage of the expansion to increase mill capacity to 10,000 – 12,000 mt/d, depending on exploration results. "We are currently undergoing an initial stage of exploration and have obtained very positive results from several open-pit zones," Vera explained.

Meanwhile, SPM's Ariana project, located in the Yauli province, is still waiting to be-

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gin construction. The company has been analyzing environmental improvements for the project that could help unlock the ongoing judicial process on the project, such as replacing wet tailings with last-generation dry tailings, as well as changing the location of the tailings facility, moving it further away from the water infrastructure. “If this initiative is approved, it will constitute a clear environmental improvement and could help us unlock the case,” Vera expressed.

### Precious metals

While the production of gold and silver saw a rebound in Peru versus 2020 figures (+9.7% and +21.5%, respectively), both segments have failed to catch up with pre-pandemic production figures. Indeed, gold production in 2021 was still 24.8% lower than in 2019, while silver output was 14% lower.

The impact of Covid-19 on precious metals production in Peru was particularly harsh. This can be partially explained by the importance of underground operations in

precious metals being mining, operations that were more severely impacted by Covid restrictions.

In this context, local company Minera Poderosa overtook Yanacocha as Peru’s top gold producer in 2021, recording a gold output of 298,500 oz, whereas Yanacocha, once Latin America’s gold producing powerhouse, only yielded 264,000 oz. Pan American Silver recorded a combined 246,000 oz gold from its La Arena and Shahuindo operations in northern Peru.

Another local producer, Aurífera Retamas, had a good 2021 with a 37% increase in gold production, yielding a total of 214,500 oz. Hochschild produced 178,700 oz, Horizonte recorded 168,600 oz, and Buenaventura presented a consolidated gold production of 160,200 oz in 2021, which excludes its former participation in Yanacocha.

The decreasing trend in precious metals production in Peru could soon be partially offset thanks to Newmont’s plans to transition the Yanacocha mine in Peru from oxides to underground sulfides with the Yanacocha Sulfuros project.

Newmont was originally on a schedule moving towards seeking full funds for the project towards the end of 2021. However, since this venture required 3,000 people in a construction workforce to be moved into Cajamarca and onto the mine site, the company deemed this a risk for employees and local communities. This led Newmont to delay the full funds decision until to the second half of 2022.

“We are still committing to spend approximately US\$500 million on the project through 2021 and the first half of 2022, on four key areas: Building the camp for the construction workforce; doing all of the detailed engineering to de-risk the project; committing to long-lead items such as oxygen plants and specialist steel for autoclaves; and doing civil works with local contractors,” explained Tom Palmer, president and CEO of Newmont.

According to Palmer, there are two sources of ore which will feed the first 20-year wave of the Yanacocha Sulfuros project. One is a layback of the Verde open pit – removing waste so the ore at depth moves out of the oxide into the sulfide ore, the

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other is the first underground mine, a decline which is already in place coming in off the Chaquicocha underground, high-grade sulfide deposit.

### Mergers & Acquisitions

While the rapid onset and spread of Covid-19 resulted in an initial slowdown in M&A across the mining sector, activity picked up quite rapidly after the lockdown. Companies today are on a relentless search to build robust portfolios, a quest which can be fueled, at least in part, by M&A transactions and consolidation. In Peru, the most prominent example of M&A activity was Newmont's acquisition of Buenaventura's share at the producing Yanacocha gold-silver-copper mine. The Denver-based miner offered US\$300 million upfront for Buenaventura's 43.65% interest, plus up to US\$100 million more dependent on higher metal prices. At the same time, Newmont will transfer its 47% interest in the La Zanja gold and silver joint venture with Buenaventura to its partner in exchange for royalties

*"Looking into the future, Cerro de Pasco Resources plans to acquire more operating mines to integrate into its portfolio to supplement its work on tailings and stockpiles."*

**Manuel Rodríguez-Mariátegui,  
Executive Director,  
Cerro de Pasco Resources**



on any future production. Newmont will also contribute US\$45 million toward future closing costs at La Zanja in Peru. Meanwhile, Trevali Mining sold its 100% interest in the Santander mine in Peru to Cerro de Pasco Resources. The Santander mine is located approximately 215 km east of Lima and comprises of an underground mine, a 2,000 mt/d processing mill, a conventional sulfide flotation mill, and associated infrastructure. Cerro de Pasco Resources' core skills involve detailed management of late stage mining operations and reprocessing of mineral stockpiles and tailings. This

draws them towards assets near Cerro de Pasco, with closure on the horizon but where they have identified an angle to extend life of mine, and this is the opportunity they have seen with the Santander mine. "While our tailings work remains an integral part of Cerro de Pasco Resources' identity, we purchased the Santander mine from Trevali Mining to help with our transition from a junior to a senior resource company," expressed Manuel Rodríguez-Mariátegui, executive director at Cerro de Pasco Resources.

### Base metals

Zinc production has experienced a fairly strong rebound in Peru, growing by 9.09% from 2019 to 2021. This coincided with a rise of over 20% in zinc prices in 2021, as they touched their highest level in 14 years in October 2021. A demand rebound after economies around the world lifted restrictions, paired with supply-side concerns over rising power costs, helped the base metal hit a yearly high of US\$3,794.50/mt.

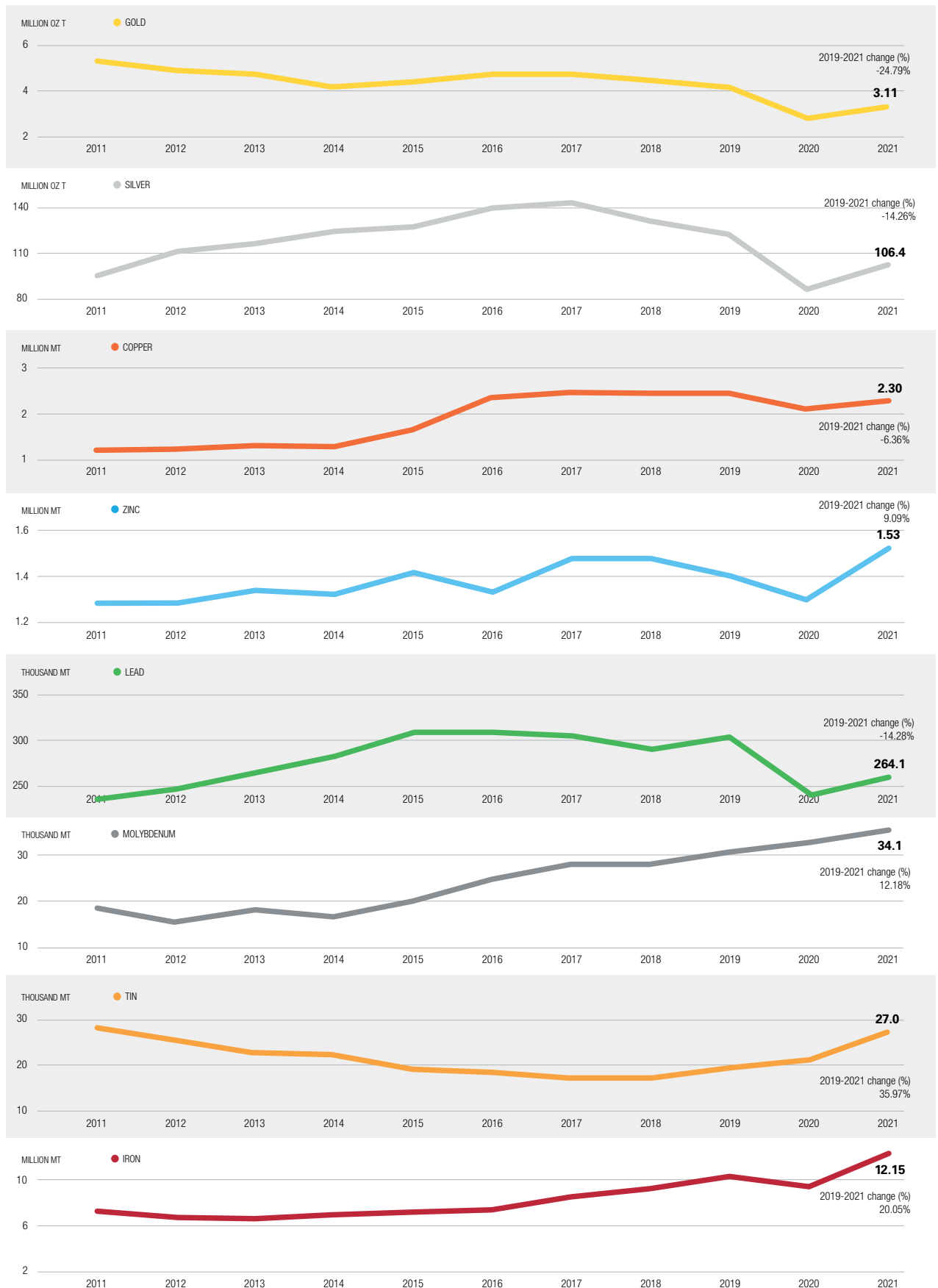
Antamina led zinc production in 2021 with 532,600 mt, representing 34.8% of the country's total, and managing to grow by 8.4% compared to 2020. The company attributed this improvement to the constant innovation in its production processes as it has implemented the use of machine learning technology to increase the production of copper equivalent in the concentrator plant.

All the country's other main zinc producers also recorded positive growth in 2021. Volcan produced over 200,000 mt zinc in 2021, including 60,600 mt from Chungar; while Nexa Resources yielded around 162,000 mt and positions itself as the third largest zinc producer in the country. ■



Photo courtesy of Minsur.

## Peru, a Diversified Metals Producer



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

# Víctor Gobitz

President,  
Peruvian Institute of  
Mining Engineers (IIMP)



*“The Peruvian mining sector is in the hands of private companies that give their businesses a long-term vision, regardless of the political situation.”*

## What have been the most significant initiatives of the IIMP since the pandemic?

First of all, we promoted an understanding between the Ministry of Energy and Mines and the Ministry of Health to establish a health protocol that could allow the mining sector to restart operations safely.

Moreover, many of our platforms went online, such as Jueves Minero, Revista Minería, as well as different events such as Pro-Explo, which had an even better reach than in person. Since it was not possible to celebrate PERUMIN in 2021, we organized a virtual Rumbo a PERUMIN. Its content was highly debated and served to maintain a technical and plural opinion on mining.

Finally, we have implemented programs involving the youth to spread the practices that are currently the global standard among professionals. We have also established a platform to exchange experiences with retired generations.

## How does Peru’s political instability affect the long-term development of the mining sector?

Although there have been many changes within the high political sphere, this has not limited the development of the mining industry. The Peruvian mining sector is in the hands of private companies that can give their businesses a long-term vision, regardless of the political situation. Regulatory bodies have also managed to maintain stability. However, we would have liked to have a more favorable environment for public-private collaboration to be able to discuss and implement territorial development plans.

Currently, the mining sector makes large contributions to the State through taxes, which in turn transfers significant amounts to the population through the mining canon. Due to the widespread uncertainty, little progress has been made in the debate on how to use these public funds more effectively.

## What projects should be the next big investments, especially in copper?

Peru has a large copper portfolio. For example, there are significant projects in Cajamarca such as Conga, Galeno, Michiquillay and La Granja. However, the lack of convergence of opinions between private companies and government bodies could risk the advancement of these projects.

I believe that we will continue seeing investments in brown-field exploration thanks to the favorable price of metals, particularly copper, and the quality of Peru’s geological deposits. The country also has an excellent ecosystem of suppliers of

goods and services, contractors, engineering and consulting firms, etc. that make investing in mining attractive despite the political noise.

## What is your outlook on the price of copper and gold?

The world is becoming increasingly aware of climate change, which is why the demand for copper is increasing to reduce the use of fossil fuels. At the same time, it is becoming more and more difficult to develop new projects globally to meet this growing demand.

In the case of gold, the scarcity of new, large deposits is making it increasingly challenging to develop sizeable projects. In addition, environmental, social and cultural regulations can slow down the development of new projects.

## How have investments in exploration evolved over the past years?

Junior exploration in Peru has decreased, first, because environmental legislation has mistakenly lumped exploration and mining in the same category, even though the latter has a much larger operational footprint and environmental impact. This has also created a false social perception. If this aspect is not resolved, exploration in Peru will exclusively take place around operating mines, where obtaining permits is easier.

Furthermore, the Toronto Stock Exchange used to be the source of venture capital for risky exploration activity. However, this capital progressively shifted to cannabis, a less risky and more attractive product than mineral exploration. Today, junior mining transactions have decreased, not only in Peru but globally. In this context, we have no choice but to promote exploration and communicate its low environmental impact.

## What are your expectations for PERUMIN in 2022, after having had to postpone it last year due to the pandemic?

We are confident that PERUMIN 35 will be a great success. After two years of dealing with the pandemic, people are eager to meet again, and PERUMIN is an excellent place to bring together mining professionals, companies and suppliers, as well as authorities and company managers. It will also be a prominent event due to the participation of Australia, our allied country, as well as other nations such as Germany, Canada, Chile, the United Kingdom and Sweden. We hope to organize the next PERUMIN in 2023, resuming our tradition of holding it on an odd year to prevent it from coinciding with other mining events.

# Exploration: The Cycle is not Enough

## *Peru's junior segment navigates political and social complexities*

For the exploration segment, 2021 was defined by soaring copper prices. Covid-related supply chain disruptions and the green energy transition have been key drivers in the price of copper increasing from US\$3 per pound (US\$/lb) in 2020 to over US\$4/lb in 2021. Copper has been trading above the latter mark for over a year, and inventories are still at near record lows, presenting huge opportunities for Peru as one of the countries with most abundant copper reserves.

The situation was slightly more challenging for precious metals. Prices dropped throughout 2021, although during the fourth quarter gold managed to claw back some of the ground it lost earlier in the year as rising concerns over the impact of the new omicron variant on global economic growth provided a boost to safe-haven demand. Similarly, silver ended Q4 of 2021 in the black.

With these favorable price conditions and Peru's richness of resources including copper, gold, silver, zinc, molybdenum, etc., the exploration industry should have great reasons to thrive. The country has attracted junior companies for years, being traditionally regarded as a low cost, low risk mining jurisdiction to carry out exploration, given its large mineral reserves and major undiscovered deposits. In addition to that, Peruvian laws, regulations and practices do not discriminate between national and foreign companies. For years, the Peruvian government has guaranteed foreign investors' legal stability, income tax regulations and dividend distribution.

However, investment in exploration has been progressively decreasing throughout the last decade, falling from approximately US\$900 million in 2012 to US\$326 million in 2021. If we ignore 2020 and its exceptional pandemic impact, this number is actually the lowest in a decade. A combination of reasons including the coronavirus outbreak, political instability, an uptick in social conflicts and excessive bureaucracy are hindering exploration activities, especially among juniors. Today, the majority of exploration investments are being made by large copper producers, par-

*"We expect to see a lot of investment in large scale copper projects to meet the supply gap expected in the second half of the decade. This will not be an easy task. Overall, we are very bullish about copper in the near-term and long-term."*

**Richard Osmond,  
Chairman and  
Interim CEO,  
Element 29 Resources**



ticularly in brownfield operations, as they seek to take advantage of favorable metals prices and do not have as many issues with the permitting process.

Richard Osmond, chairman and interim CEO of copper explorer Element 29, provided a snapshot on current market sentiment: "Peru seems to be lacking political stability as of late. If there is a perception of instability, it makes it much harder for companies to attract foreign investment for mine development all the way down to early grassroots exploration. This is something that the country should take seriously given the importance of mining to the national and local economies," he explained.

### **Copper juniors take the spotlight**

A lack of major development projects on the horizon after Anglo American's Quellaveco comes into production in 2022 has sharpened the spotlight on Peru's copper-focused juniors.

In the copper space, Latin Metals has been following the prospect generator model. The company rebranded in 2019 from Centenera, and today has a large copper-focused portfolio in Peru. The

**E29**  
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**Exploring New  
Copper Assets  
in Peru**

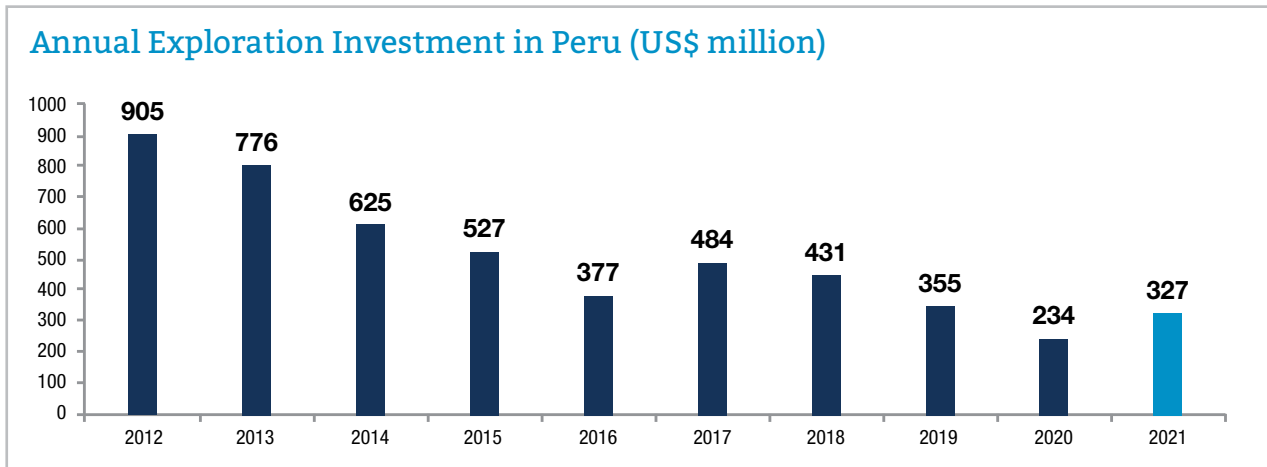
- Two advanced copper projects in Peru:  
Elida and Flor de Cobre
- Well-mineralized intercepts from historical drilling
- Located at low elevations, near infrastructure and strong community support

**2022 WORK PLAN:**

**Elida:** Follow up on a Phase I drill program with a maiden resource estimate and Phase II drill program

**Flor de Cobre:** 2022 drill program and updated resource estimate

**Contact:** Richard Osmond, Interim CEO & Chairman  
Tel: 1-888-246-7881 E-mail: info@e29copper.com  
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Source: Ministry of Energy and Mines (MINEM)

company’s strategy involves looking at multiple jurisdictions and commodities before acquiring projects and beginning the low-cost surface exploration. From there, rather than spending money on drilling, it secures partners who finance the project moving forward. While the discovery is thus made by the partner, Latin Metals retains a minority interest. “This

presents a clear benefit for our shareholders, as their stock in the company is not diluted as a result of multiple large financings,” explained president and CEO Keith Henderson.

Latin Metals has built some significant partnerships with some of the big mining names such as Hochschild Mining, Newmont and Yamana Gold. Within the past

year, the company has signed deals with Barrick, Libero Copper & Gold, AngloGold Ashanti, and Patagonia Gold. At the moment, one of Latin Metal’s main projects is the Lacsha property, where it made a deal to engage in early-stage work. In December 2021, Latin Metals signed a three-year deal with the community, enabling it to secure a drill permit. “We are confident that these activities will allow us to find a partner,” Henderson commented.

2021 has been an eventful year for exploration company Element 29. Since completing its IPO in December of 2020, it has been advancing its two assets, Elida and Flor de Cobre. The company completed its Phase 1 drill program at Elida in mid-December 2021 and achieved better-than-expected results. “For example, the last hole we drilled had a 909 m interval of 0.55% copper equivalent, including a 340 m interval of 0.67% copper equivalent,” revealed chairman and CEO Richard Osmond. Simultaneously, Element 29 has been focusing on the Flor de Cobre project, a copper porphyry located near Arequipa, close to Chapi and Cerro Verde. Within that project, the company started drilling the Candelaria copper porphyry in early February 2022 to verify the results from the historical resource estimate and extend the drilling to depths of over 500 m, to also test the primary copper sulfide potential in the hypogene mineralization below the enrichment blanket. Element 29 has already begun the permitting process at the Atravezado target and hopes to complete it before the end of 2022. “The social licenses will take time as the nearby community has been designated an indigenous community, meaning

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### FOLLOWING A PROSPECT GENERATOR MODEL IN SOUTH AMERICA

Latin Metals is a mineral exploration company with a diversified portfolio of gold and copper exploration assets in South America. Our investor-focused Prospect Generator model brings certain potential advantages to shareholders:

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- DISCOVERY:** Retained minority interest across a larger project portfolio - shareholders exposed to discovery upside

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*“ESG-related matters have become our most important concern when looking into all projects, especially in Peru. When we select properties, we investigate not only the prospects for mineral discovery but also the communities with whom we will be working with.”*

**Keith Henderson,  
President and CEO,  
Latin Metals**



*“Peru has fantastic geology and hosts many giant deposits, such as our northern neighbour Tintaya, and Cerro Verde in nearby Arequipa. For large-scale porphyry discoveries, which is what we are looking for at Pinaya, Peru is one of the best places to be.”*

**Mark Gibson,  
COO,  
Kaizen Discovery**



there are additional processes involved,” Osmond explained, however, he does not anticipate any major complication in coming to an agreement with this community due to their familiarity with mining.

By the end of 2022, Element 29 expects to have initial resource estimates for both the Elida and Flor de Cobre projects. At Elida, it will undertake a Phase 2 drill program to expand the initial resource estimate by mid 2022. At Flor de Cobre, it plans to move the project towards a PEA to ultimately make a production decision. Camino Corporation is another junior that has been taking advantage of the thriving copper prices. The company, which has been revisiting old projects, has three assets; the Maria Cecilia copper porphyry complex, the Los Chapitos copper IOCG district, and the Plata Dorada high-grade copper and silver project. CEO, president & director, Jay Chmelauskas was drawn to Los Chapitos project because of previous drill results from 2017 that indicated the potential scale and grade for a copper mine. “The company has capped 2021 with a final drill program, the results of which supported our thesis that we have a major iron oxide mineralized system,” he explained.


The program consisted of five exploration holes located several kilometers outside of the discover holes they had historically drilled. “Each hole in the December 2021 drill program hit copper mineralization, with grades up to 1.05% copper,” Chmelauskas added.

In the gold-copper space, Kaizen Discovery holds the Pinaya gold/copper project, located between Moquegua and Puno in the same belt as productive and world-class porphyry and skarn systems, includ-

ing Las Bambas, Tintaya, Constanca, and Antapaccay. Kaizen Discovery completed a drilling program at Pinaya in February 2022 and released the results on 1st March, which confirmed the presence of shallow gold mineralization associated with base metal veins and skarn. “The newly identified mineralization confirms that Pinaya is a large, multi-phase porphyry-related system with mineralization occurring over an area of at least 5 km by

2.5 km and with potential for new concealed porphyry copper-gold intrusions,” commented Mark Gibson, COO at Kaizen Discovery. The next step at Pinaya will involve a geophysical survey. “We think this is going to be one of the largest IP surveys ever done, and certainly the largest one in Peru as it will comprise nearly 130 km<sup>2</sup>,” explained COO Mark Gibson.


Kaizen will use Typhoon IP-resistivity geophysical equipment from majority



# KAIZEN DISCOVERY

## EXPLORING THE PINAYA COPPER-GOLD PROJECT IN PERU

- Located in the Andahuaylas-Yauri Porphyry-Skarn Belt
- Recent drill program confirms the large size of the Pinaya hydrothermal system
- 129km<sup>2</sup> Typhoon™ Deep-Penetration IP-resistivity survey is underway to identify new porphyry targets for 2022 drilling



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Photo courtesy of Element 29.

shareholder HPX (High Power Exploration) to explore the Pinaya system to depth, which, according to Gibson, brings several great advantages. "It can output a high current that is adjustable according to the depth and scale of the exploration target. This is combined with high voltages that are also adjustable to overcome near-surface resistance. It also outputs an extremely clean signal, which yields a high signal to noise ratio in recorded data. Our partner company Computational Geosciences can then rapidly and accurately process the recorded data to make models for interpretation," Gibson explained.

### Peru's attractiveness for juniors

Despite a challenging political and social context resulting in higher perceived risk by investors outside of the country, there is plenty of activity in Peru's junior segment and much to be optimistic about. The country's geological potential, combined with thriving copper prices and an increasing need to supply minerals that are necessary for the energy transition, enhance the need to invest where those resources exist, despite national instability.

In a country where the mining industry has been marked by social conflicts, sustainability has become more than just a buzzword and explorers are making great efforts to reach beyond environmental compliance and making high-level commitments in the public domain around environment, social and governance (ESG) issues. "The political situation in South America resembles that of the rest of the world in the sense that companies need strong ESG strategies now more than ever. It is a strong part of our mission to educate people that mining is necessary for the energy transition and that it is imperative that these metals be developed in a responsible way," expressed Jay Chmelauskas, president and CEO at

Camino Corporation.

While the exploration and mining sector is not immune to political turbulence, it does transcend a lot of these issues thanks to the resilience it has built over the years. Keith Henderson from Latin Metals shared his vision on operating within the current political climate: "Mining countries typically go through political cycles with the government. Because we are working on relatively early-stage exploration projects that will not transition into production for a while, we believe that the political environment will likely be more favorable by the time one of our properties advances to that stage. We have long-term belief in Peru as a mining country." ■

*"The copper supply has been forecast by many of the world's top banking firms to be in a major deficit over the next 10 years from depletion and underinvestment in new projects in the copper market."*

**Jay Chmelauskas,**  
President and CEO,  
Camino Corporation





# Consultancies and Contractors

## A renewed focus on ESG

Covid-19 has drastically changed the way of doing business. Consulting firms, for instance, shifted to remote work in 2020, and many of their activities are still done remotely to this day. While the consulting segment was expecting a moderate uptick after the hardships of the pandemic, 2021 turned out to be one of the best years in many companies' history. Gustavo Bravo, mining director for Latin America at Canadian multinational services firm WSP, attributed the boost in the demand for its services to the sum of two elements: "Some projects that were planned for 2020 were postponed to 2021 due to the restrictions associated with the pandemic, and the price of metals increased substantially," he explained.

2021 was also a remarkable year for SRK Consulting in Peru, which, according to director Antonio Samaniego, had one of the best years of its history. "Geoengineering is currently SRK's most active department in Peru, which does work related to mine waste management and mine closure studies," he explained, also noting a moderate increase in the demand of optimization studies for mining operations.

Similarly, Paul Murphy from Australian mining engineering and consulting firm Mining Plus, noted a renewed emphasis on sustainability in 2021. "Companies now understand that in order to get projects permitted and financed they must put sustainability at the forefront of their studies."

Indeed, the days of working exclusively to deliver quarterly results are over. The Covid-19 pandemic and rising social conflicts across the nation have focused attention on social inequalities, putting pressure on companies to go beyond their regulatory obligations and take responsibility for driving social equality in the regions in which they operate. "For Mining Plus, it is not about simply calculating the best economic return from an engineering mind-set (NPV, IRR, etc.), but it involves considerations including

softer factors such as market perception or social license to operate," Paul Murphy from Mining Plus continued.

On the topic of sustainability, WSP has greatly strengthened its expertise in ESG matters since the acquisition of Golder in April 2021. Gonzalo Covarrubias, general manager for WSP in Peru, highlighted the introduction of a new program that is especially popular among mining clients, as it allows a comprehensive and transversal view of the challenges affecting their projects: "Our new global innovation program called Future Ready has the objective of analyzing future trends through four lenses, including climate, society, technology and resources, and can advise and design projects accordingly," he explained.

## Towards better tailings build, management and closure


Within the topic of sustainability, tailings management has become a major concern for mining companies. After the Brumadinho tragedy in Brazil in 2019, experts agree that tailings management has improved enormously across the globe, and Peru is no exception. Many businesses in Peru are already adapting their tailings management facilities to the recommendations of the Canadian Dam Association (CDA) or to the International Council on Mining and Metals (ICMM) guidelines, which in 2020 published the Global Standard for Tailings Management and is mandatory for its members.

## Cradle to cradle

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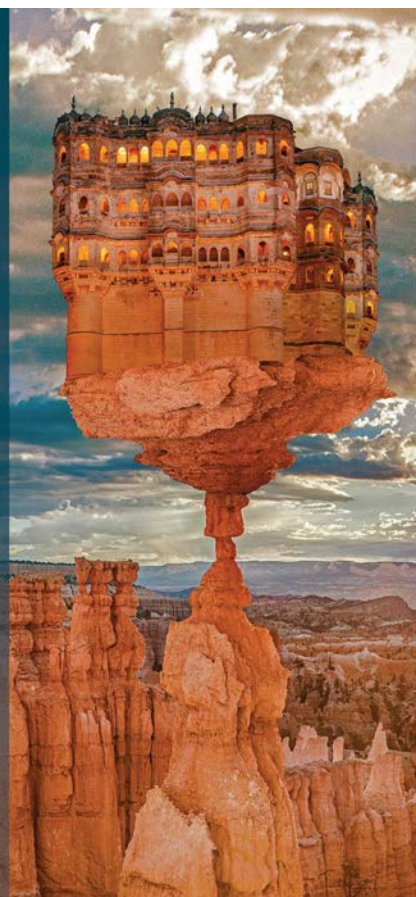
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*“We have seen more activity in the ‘define’ segment of our business, in the form of due diligence studies. This may be in part due to the market strain caused by Covid-19 fueling increased activity with mergers and acquisitions and streaming royalties.”*

**Paul Murphy,**  
Manager – South  
America,  
Mining Plus



*“Moving forward, sustainability will become increasingly important both for SRK and the mining industry. This will not only be related to the remediation of liabilities, but also to the use of new technologies in all stages of the mining cycle, starting with exploration.”*

**Antonio Samaniego,**  
Director,  
SRK Consulting



The Canadian engineering, geoscience and environmental consulting firm Klohn Crippen Berger (KCB) is currently helping many mining companies in Peru to adhere to the CDA or ICMM guidelines and expects even more requests in the near future. “ESG standards are becoming increasingly important in tailings design and management,” noted Betty Celis, project manager at KCB’s South American office in Lima.

Denys Parra, general manager at environmental, construction and engineering consultancy Anddes, pointed to several improvements in the Peruvian mining sector’s approach to tailings:

“The industry is starting to include the figure of the Engineer of Record, who can make significant contributions to tailings management, as well as the Independent Geotechnical Review Board, which is a group of experts that reviews the main components of critical facilities. It is also making substantial investments in the real-time monitoring of tailings facilities.”

Reflecting on the sector’s progress with regards to tailings management, Antonio Samaniego, director at SRK Consulting, also noted that Peru is advancing rapidly on the Global Action on Tailings (GAT), an initiative developed under the Global Mining Professionals Association (GMPA) sponsorship. The idea is to propose strategies for adequate tailings build, management and closure. The SME, a GMPA member, released a tailings handbook in 2021 to cover new topics that the industry will need to consider when looking at tailings management, such as climate change.

### Going underground

The majority of Peru’s iconic mines in recent years have been open-pit operations, such as Antamina, Las Bambas, Cerro Verde and Toquepala. Because Peru’s mining sector had a period of inactivity in the 1980s, the country lost around 15 years of development opportunity. Therefore, Peru has not yet seen the transition to underground mining for some of the larger pits. Underground mining nevertheless represents a large portion of production in Peru, but that generally comes from medium-sized operations such as El Brocal, Cerro Lindo and Condestable. “The transition to underground mining for some of the larger pits is coming, and when it does, it will likely be on a grand scale,” said Paul Murphy from Mining Plus. For that reason, companies such as Byrnescut Mining, an international specialist underground mining contractor and part owner of Mining Plus, is actively ramping up in Peru. “We believe that services that help mining companies look at opportunities to transition from surface to underground mining will be highly demanded in the near future here,” commented Greg Jackson, managing director of Byrnescut.

As a reflection of this progressive shift towards underground mining, Newmont is planning to transition its Yanacocha mine in Peru from oxides to underground sulfides with the



Photo courtesy of AESA.

Yanacocha Sulfuros project, providing substantial opportunities for underground contractors. Underground mining contractor AESA recently signed a joint venture with Redpath Mining with whom it won a tender for the integral development of the Yanacocha Sulfuros project. “We are designing the operation of the project together with Newmont considering semi-autonomous scoops, drilling and support equipment with remote operation, and real-time mapping of all our personnel and equipment. We are also planning a medium-term migration to electric equipment,” revealed Gianflavio Carozzi, CEO of AESA.

In recent years, AESA has worked with some of the country’s main mining companies including Minsur, Raura, Volcan, Cerro Lindo and Glencore. Lately, the company has been focusing on improving its capabilities to offer more comprehensive services, adding shotcrete application and ore transportation to its portfolio. “In the last year, mining companies have preferred to concentrate service contracting to fewer companies that have greater management capacity and a stronger ability to react to uncertainty,” Carozzi explained.

The past year has also been busy for Peruvian contractor INCIMMET, which

*“In Peru, underground mining is moving towards the implementation of technological solutions, especially related to the automatization of certain activities that allow greater productivity and safety, as well as to environmental sustainability.”*

**Gianflavio Carozzi,**  
CEO,  
AESA



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*“For medium and small operations with relatively low levels of complexity, there are contractors in Peru that can take on the challenge of virtually managing the whole mine for the client.”*

**Eduardo Cossio  
Chirinos,  
CEO,  
INCIMMET**



*“We have seen substantial advancements in automation and the use of remote technologies over the past years, some of which was brought forward by the impacts of Covid-19.”*

**Greg Jackson,  
Managing Director,  
Byrnegut**



is currently focusing on expanding its international presence to countries including Ecuador, Bolivia, Mexico Argentina and the Dominican Republic. While the company has been diversifying towards the provision of open pit mining services, much of its business continues to be related with underground mining. “Our most requested services continue to be horizontal excavation and mine development,” commented Eduardo Cossio, CEO of INCIMMET.

In 2021, the company won a tender to expand its mine development service for Nexa’s Cerro Lindo, becoming the leading contractor of the operation. “We have been working for Nexa for around eight years, and this tender will extend our

business relationship for an additional four years,” Cossio explained.

INCIMMET has been working extensively on the development of new technologies, especially related to underground safety. For example, the company is currently developing a drone that has a built-in thermal camera with software capable of interpreting the change in temperature of the rocks. This allows it to identify the places with potential risks of landslides. In addition, INCIMMET recently won an award for the development of a robotic arm to load drills for blasting. The sensors make the arm completely autonomous in placing the explosive and the detonator.



Photo courtesy of Tumi Raise Boring.

*"We are evolving from being purely a raise boring company to developing drilling technologies for the underground mining market."*

**Belisario Tijero,**  
General Manager,  
Master Drilling



*"In addition to automation, we are shifting towards electrification of our equipment to eliminate pollution caused by diesel motors. Moving forward, all of our crawlers will be battery powered."*

**Marc Blattner,**  
General Manager,  
Tumi Raise Boring



### Raise boring and shotcrete innovation

While there are numerous limitations for technological adoption in the underground segment, R&D is booming among raise boring contractors and shotcrete specialists. As mines get deeper and venture into more uncharted territories, underground machines must be able to drill deeper, faster, and more accurately. Raise boring contractor Tumi Raise Boring and drilling specialist Master Drilling are pushing the adoption of new technologies, each one in their separate niche.

Tumi Raise Boring, for instance, began work on a fully remote-controlled raise boring machine in 2022, in line with a future which, Tumi predicts, will be fully remote controlled. "This technology will allow to control the piece of equipment from Canada that drills a hole in Peru, for example," illustrated Tumi's general manager Marc Blattner.

According to Blattner, there are currently no fully automated raise boring operations in Peru, and Tumi was in fact the first company to introduce semi-automation with its SR line of self-anchoring, self-leveling equipment. Tumi has traditionally worked as a contractor in the Peruvian market and has sold machines to other countries including Mexico. However, the current political instability has provided Tumi with the final push to expand operations

to other countries. It has moved into Brazil and is also starting operations in Mexico and Canada. While the engineering and design is still based in Peru, much of the manufacturing has been moved to Texas (USA), and the company is also looking to expand the robotics and engineering team into Houston.

In parallel, South African multinational Master Drilling has seen a resurgence in its raise boring services in Peru and has managed to win back several clients that it had lost over the past few years. The company is currently working with many of the main protagonists of underground mining segment in Peru, including Volcan, Condestable, Minsur, Buenaventura and Colquisiri. With a strong focus on innovation, Master Drilling was a pioneer of horizontal raise boring (HRB) technology, which is used to create horizontal excavation between two existing tunnels in an underground mine and was developed to replace dangerous drill and blast activities.

Master Drilling has been consolidating some new solutions in Peru. "Last year, we started to promote vertical shotcrete, which allows to construct chimneys in a way that was not possible before through raise boring. We have been extremely successful with this new method as it offers a very reliable and safe technical solution for our clients," commented Belisario Tijero, general manager of Master Drilling Peru. ■

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## Equipment, Technology & Services

*The mining industry lags behind its peers in technological adoption, but the pandemic has acted as a great accelerator*

Photo courtesy of Ferreyros.

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Mining tends to be regarded as a highly conservative industry with a low technology adoption rate. In fact, a study carried out by Boston Consulting Group that measured the digital adoption rate by industry at a global level, revealed that in 2021, the mining industry is 30-40% behind compared with its peers like the automotive or petrochemical industries.

While the mining industry seems to have advanced in slow motion for years, key actors across the value chain agree that the pandemic and soaring metal prices have given the sector an irreversible push towards technological adoption. "In Peru, we see that the mining industry is hungry for technology adoption, open to sharing its problems and willing to ask experts for help in building technological solutions," expressed Carlos Calderón, general manager at Sitech, a Ferreyrcorp group company specialized in introducing technology solutions to mining operations.

With a renewed interest in the latest technologies, original equipment manufacturers (OEMs) have a lot to bring to the table. They are experiencing tremendous opportunities in the mining industry, in particular thanks to the increasing demand for metals involved in the energy transition, most notably copper.

For example, Ferreyros, a leader in heavy machinery, and its subsidiary Caterpillar put the first autonomous trucks in Peru into operation in the Quellaveco copper project. At least eight Cat 794 AC units have been introduced onsite, which are part of an autonomous fleet that will reach a total of 30 trucks of this model in the mine. The trucks will ultimately be loaded by the mine's three 7495 Cat rope shovels as well as a Cat 6060 hydraulic shovel.

2021 was also a remarkable year for Komatsu-Mitsui Maquinarias del Peru (KMMP). Tomás Martínez, CEO, revealed that

2021 was a record year for the company in terms of sales and profitability, where they managed to grow 10% compared to pre-pandemic levels.

At Antamina, KMMP is currently testing four large 980E-5SE trucks with a payload capacity 400 short tons (363 mt) and equipped with a Cummins QSK-9 engine, which allows moving more material faster, and thereby increasing productivity. “We are very pleased that Antamina has decided to incorporate these four 980E-5SE trucks, and hope that these will be the first of many more in the Peruvian market,” CEO Tomás Martínez commented.

Today, Martínez sees automatization as one of the most powerful trends in Peru. “We are currently in negotiations with clients to introduce autonomous trucks in Peruvian mines. We hope that this will be a reality after 2023 as they can bring advantages related with productivity, efficiency and safety,” he shared.

2021 was also a record year for the John Deere and Wirten Group distributor IPESA, as it managed to grow around 40%. “The logistics crisis that we are going through has created a shortage of machinery. This has benefited companies like ours which hold good levels of inventory,” co-CEO Giorgio Mosoni explained.

At the end of 2021, IPESA also assumed the representation of Paccar (Kenworth and DAF trucks), as part of the company’s strategy to increase its presence in the mining industry and reach new clients. The first trucks were delivered at the end of January 2022. IPESA has also been introducing new technologies such as surface miners (Wirtgen), crushing equipment (Kleeman) and loading solutions (Morooka), which, Mosoni argues, other companies do not offer.

On the topic of technology, Mosoni revealed that the company has doubled the capacity of its monitoring center in Peru to provide clients with accurate information about the machinery, including fuel consumption, time-outs, machine efforts and operator efficiency. “Through this monitoring center, we can constantly analyze the alarms generated by the monitoring systems of our equipment and therefore inform our clients about possible damages even before they occur,” he explained.



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CEO, Komatsu-Mitsui  
(KMMP)



**Giorgio Mosoni,**  
Co-CEO,  
IPESA



**Franklin Pease,**  
General Manager,  
Normet Peru

**Innovations in underground equipment**

It is widely known that the harsh conditions of underground mines present significant challenges for incorporating innovation. In particular, a big limitation for the introduction of technology in Peru’s underground segment is the existence of numerous narrow-vein operations. Local equipment manufacturer Resemin has managed to turn this challenge into an

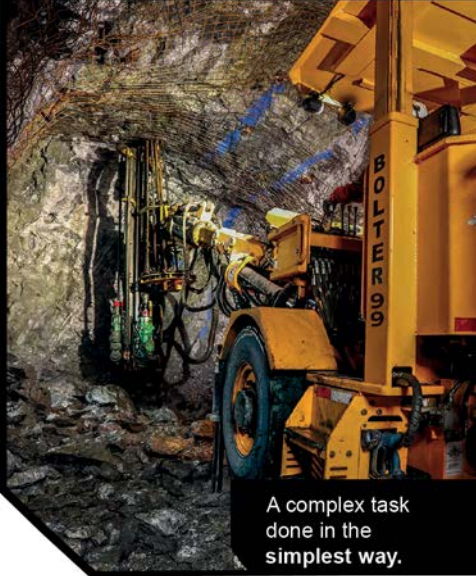
opportunity and has progressively gained international recognition for its specialist equipment suited to narrow-vein operations. “During 2021, we have managed to consolidate our Muki equipment, a line of small-sized jumbos suited for narrow-vein operations,” expressed James Valenzuela, CEO of Resemin. According to Valenzuela, 2021 was the best year in Resemin’s history. The company’s roof bolters have been the best-selling machines. “The market has realized the ben-

efits that these roof bolters bring in terms of reliability, productivity, ease-of-use, maintenance costs and the limited use of electronic sensors,” he explained. Among the company’s latest innovations, Valenzuela highlighted Resemin’s creation of the narrowest explosive loaders on the market, with a width of 1.30-1.50 meters. The company is also waiting for the patent for its T-pointer system, used to perform scaling with a jumbo. In addition, Resemin is currently trying to consolidate its most disruptive machine, which, according to Valenzuela, is the Dual Jumbo, which performs both face drilling and roof bolting. Finally, Resemin also expects to offer battery powered equipment by July 2022. Another limitation for the introduction of technology in the underground segment is the fact that mechanization is still a work in progress. However, Franklin Pease, general manager of Finnish OEM Normet, has observed a great acceleration in the mechanization of underground processes, especially since the pandemic, noting that mining clients have become aware of its notable contribution to safety and productivity. “We see significant growth opportunities related to the renewal of machines and to the mechanization of new processes,” Pease expressed. In addition, Normet is observing an increasing interest in the adoption of electric vehicles and electric equipment underground. Pease noted that electrification is already part of many Peruvian mining companies’ strategic plans. In this sense, Normet has already begun working on a family of electric equipment for tunnel construction. Like Normet and Resemin, the Bosch Rexroth group has identified a great market opportunity related with electrification


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*“Peruvian mines are becoming increasingly interested in electrification technologies, and I believe the pace of adoption of electric vehicles will depend to a large extent on product availability.”*

**Kai Rothgiesser,**  
General Manager,  
Bosch Rexroth



*“Full automation can make machines less reliable, because it requires a lot of sensors, and narrow vein underground mining is the worst environment for this due to the corrosion, humidity and dust.”*

**James Valenzuela,**  
CEO,  
Resemin



in Peru, and is currently working on a portfolio of products for the electrification of mobile equipment in underground mining called eLION. The eLION family covers a variety of components, including a full range of electric generators, inverters, and accessories as well as tailored gearboxes, hydraulics and software. “We have already launched six prototypes worldwide, five of which are in Europe and one in Peru,” revealed Kai Rothgiesser, general manager of Bosch Rexroth Peru.

To create this new line of products, Rexroth’s know how of hydraulic systems and components has been combined with Bosch’s expertise in the automotive industry and knowledge of electric systems. “We have managed to take advantage of the

synergies between both companies to create a unique product in the industry,” Rothgiesser continued.

The group sees great potential for this portfolio among machinery manufacturers in Peru, but also plans to offer it as retrofits for other machines. Mass production of this portfolio is expected for June 2022.

**Towards data integration**

The Peruvian mining industry is increasingly understanding the benefits of using digital solutions and data analytics to optimize operations, asset performance and reduce risks. However, to get

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**Victor Huaco,**  
Director Latin America,  
Zyfra



**Carlos Calderón Torres,**  
General Manager,  
Sitech

this right, mines need to overcome the legacy of their operations, which are often broken down into individual operating silos, with ineffective integration between mine, processing and transport. In order to bridge these elements of the supply chain, Finnish-Russian technology provider Zyfra has created an industrial internet of things (IIoT) platform. Its aim is to integrate all the different islands of data that exist in the mines - related to the plant, fleet control or security, for example - and combine them in a centralized platform where advanced analytics can be applied to improve effectiveness, safety, and profitability. "Our IIoT platform is creating great interest among tier one mines in Latin America," commented Victor Huaco, director at Zyfra.

Huaco also noted that mines are focusing more on how to improve their activities at their plants to increase production. In this sense, digital advisors are being increasingly requested by clients. "Through artificial intelligence instruments such as machine learning, we can develop algorithms to suggest changes to the operator that can lead to better results at the plant," Huaco explained. Carlos Calderón, general manager at Sitech, explained how the Peruvian mining industry is not anymore in the process of adopting technologies 4.0, and instead, is in a second level of integration to achieve the next level of predictability. As an example, he explained how two of the technologies that they offer can be combined to make predictions. On one hand, their Caterpillar DSS solution is a camera that can interpret and describe operators' microsleep through facial recognition. On the other hand, Readit's Smartbands can monitor the level of alertness of all the staff within the mines. "Today, we are able to combine the information from the DSS with that of the Smartband to predict the possibility of microsleep during an operators' shift, based on how much sleep he or she had the night before," Calderón explained.

**Material handling**

With more mines and processing plants running around the clock, mining operators require material handling equipment that is reliable and needs less maintenance. In a country where permitting new projects is a growing challenge, and in a context of thriving metals prices, companies involved in the processing

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*“The Peruvian mining industry is becoming increasingly interested in technologies for the preventive maintenance of their conveyor belts, as they mean greater reliability, plant availability and predictability.”*

**Fernando Barrio,  
General Manager,  
Tecnomina**



and handling of ore have become particularly valuable. One of the Peruvian players in the segment, Tecnomina, had the second-best year in the company's history in 2021, with an 8% increase in sales compared to 2020, according to general manager Fernando Barrio. The company recently renewed a comprehensive maintenance contract with phosphate mine Miski Mayo, where they take care of activities including belt reparation, pulley coatings, idler replacement or belt scraper adjustment. In addition, Tecnomina has achieved a two-fold commitment with Anglo American Quellaveco. “On one hand, we are working on belt assembly and splicing at the Ilo port through the Belfi Cosapi consortium, as well as on belt splicing in the plant through

Cumbra. On the other hand, we have won the tender to supply Quellaveco with Sempertrans conveyor belts and splice kits for the next three years,” Barrio explained.

As the whole industry turns towards new technologies to improve efficiency and safety, so are material handling companies. Maintenance in particular has become one of the key target areas for new investments.

Tecnomina, for example, has been investing heavily in new technologies related with predictive maintenance. It has incorporated the latest equipment in dynamic radiographic inspection, which allows X-raying of the steel cable conveyor belts while they are in motion, without having to stop production.

Similarly, Martin Engineering is also allocating significant amounts of money to remote monitoring and remote technical support, which has become especially important since Covid. The company's remote monitoring solutions are currently available for their primary belt cleaner products, but they will soon be applied to other product lines. “We have developed a belt trace detector, which we have already implemented in Brazil. It allows us to detect very quickly and accurately if the conveyor belt suffers any damage and stop its movement only if necessary. This allows to minimize damage and maximize production,” explained Javier Schmal, vice president for Latin America at Martin Engineering.

To achieve this, Martin Engineering uses two complementary technologies, one based on vibration and the other one based on a laser video analytics system, both of which minimize the possibility of false alarms. ■

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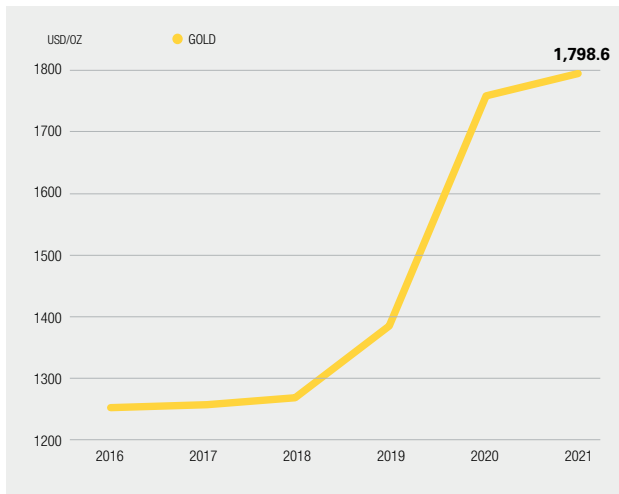
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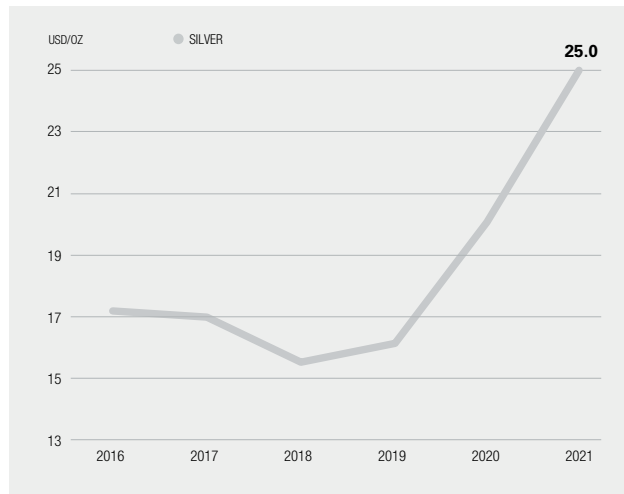
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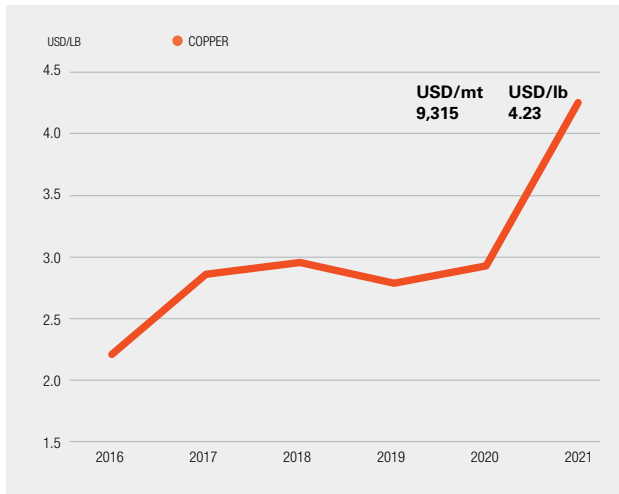
### Evolution of Metal Prices



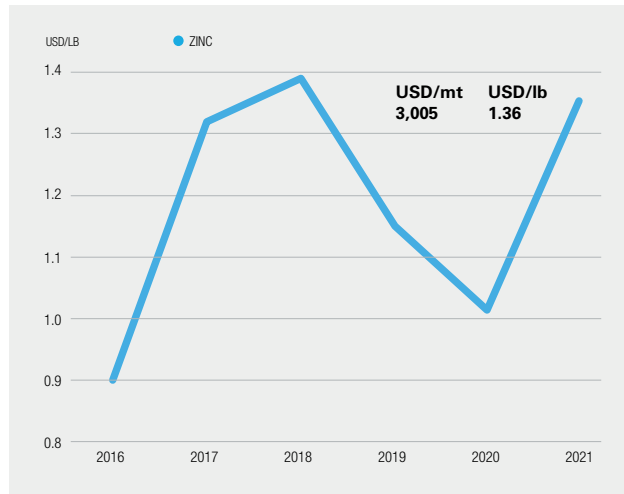
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