



SPECIAL  
**PERU**  
BICENTENNIAL EDITION

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INDUSTRY EXPLORATIONS



## PERU MINING 2021



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Engineering & Construction - Equipment & Technology - Services



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Dear Reader,

“The people have awakened,” declared Pedro Castillo from a balcony in Lima on Thursday evening, June 11th, after the narrowest of election victories.

What does a *Perú Libre* government mean for Peruvian mining? If Covid-19 was the dominant theme of 2020, then the ramifications of a new government has undoubtedly been the prominent talking point in over 120 interviews conducted by Global Business Reports (GBR) in the first half of 2021. Could the situation mirror the Ollanta Humala presidency in 2011, when he rose to power on the back of anti-establishment rhetoric, but soon cooperated with market actors when faced with economic reality?

In 2020, investment into Peru’s mining industry totaled US\$4.33 billion, a decrease of over 29% from the US\$6.15 billion spent in 2019, according to MINEM figures. However, the market has rebounded well in 2021. Producers have been looking to make up for time lost during the three-month lockdown in 2020, spurred on by the surging copper price, which hit an all-time-high in May 2021, and has remained over US\$4/lb since February.

A bullish sentiment surrounding copper from a medium to long term perspective was already evident, but few could have predicted how the red metal would thrive during a global pandemic. Macro fundamentals, such as the growing electric vehicle (EV) movement and planned infrastructure spending, present a tremendous opportunity for Peru as the world’s second largest copper producer. To fulfill this potential, political stability and addressing a cumbersome permitting process are urgent.

Sustainability, meanwhile, has evolved to become an overarching theme impacting all facets of mining. Rather than being an afterthought at the back of company PowerPoint presentations, ESG is now at the forefront of corporate strategy. Sustainability is of particular importance in Peru, where project development has frequently been obstructed due to a difficult relationship between the mining industry and local communities.

To cover these topics and provide a comprehensive guide to the different companies involved in Peru’s mining value chain, GBR has renewed its strategic partnership with the Canada-Peru Chamber of Commerce (CCCP). CCCP is the country’s leading bi-national mining chamber, and promotes commercial relations and investment as well as organizing the Peruvian annual presence at the PDAC Convention in Toronto. The result of this collaboration is the production and distribution of ‘Industry Explorations - Peru Mining 2021’, an up-to-date review of the current operations and projects and the latest trends in Peru’s mining industry.

We thank all of our interviewees for their time and collaboration. We also thank you for choosing Peru Mining 2021 as your source of information about Peru’s mining industry and hope it can contribute to a successful year ahead.



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



**Jorge León Benavides**  
President,  
Canada-Peru Chamber of Commerce  
(CCCP)







# INTRODUCTION TO PERU

"Since I have been here I have seen the tremendous opportunities that Peru's mining sector presents, and I think this should be emphasized more than it is. As an industry we need to sit down with government and figure out how we are going to capture this opportunity to benefit the Peruvian people."

- Tom McCulley,  
CEO,  
Anglo American Peru

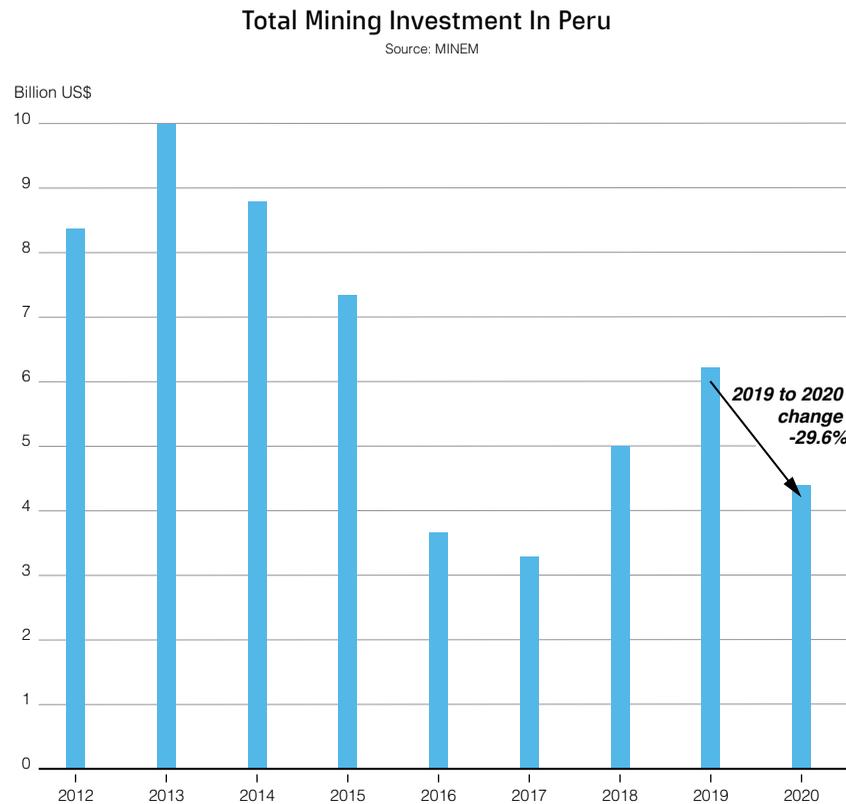


# Peru Enters a New Era

## WHAT WILL A CASTILLO GOVERNMENT MEAN FOR PERUVIAN MINING?

“The people have awakened,” declared Pedro Castillo from a balcony in Lima on Thursday evening, June 11th, as the final votes were being counted in the narrowest of election victories. Castillo’s Perú Libre party won with 50.2% of the public vote, a 0.36 percentage point lead over Keiko Fujimori’s Fuerza Popular party (by a margin of less than 70,000 votes). Unfortunately, but perhaps inevitably, Fujimori was quick to call foul play, alleging claims of voter fraud in a move that evoked former US president Donald Trump’s reluctance to concede to Joe Biden.

To add to the drama in the wake of the election, José Domingo Pérez, the lead prosecutor in the Odebrecht corruption case, urged a judge to send Fujimori back to prison after allegedly meeting with a witness. Needless to say, the political turbulence that has characterized Peru in recent years looks set to continue in the short term, which is a blow for a country that has suffered more than most during the Covid-19 health crisis. As of September 2021, Peru held the grim title of highest Covid mortality rate per million of population, in addition to experiencing the biggest economic contraction in South America in 2020. What exactly the people have awakened to is yet to be seen, but Castillo’s victory signals the dawn of a new era for Peru, an era that the country’s mining sector awaits with trepidation. For many Peruvians, Castillo vs Fujimori was a choice between being shot in the foot or shot in the hand. However, from the 120 interviews conducted for this report, it was clear who Peru’s mining industry preferred, and it was not the candidate threatening to retain up to 70% of mining profits.



Perhaps the key question is, how did it come to this? The unexpected rise of a relatively unknown rural school teacher speaks to how the pandemic has thrown politics into upheaval, reported the Wall Street Journal. Castillo capitalized on anger over a market model that left behind the country’s poorest, a gap that has been particularly evident during the pandemic as hospitals collapsed and oxygen tanks ran out. “Covid-19 has been the fuel onto the fire of a long-standing and deep-rooted social and political problem in Latin America,” stated Michael Cullen, managing director for Latin America at FTI Consulting. Questioning why Latam, which is home to 8% of the global population but has accounted for 20% of Covid deaths, has performed so poorly in the face of the pandemic, Cullen suggested that populist governmental policies were not solely to blame. “There is something more endemic and pernicious at play, and the root cause is inequality.” Expanding on the issue, Cullen explained how a rise in leftist politics is the result of a perfect storm of historical inequality, growing poverty and a

corrupt establishment. He added: “A relatively uneducated father from a large family in Lima does not want a discussion about the benefits of Keynesian economic strategies in a time of recession – he simply wants food, shelter and work.” Anthony Hawkshaw, president and CEO of Bear Creek Mining (TSXV: BCM), also observed how deep rooted issues of inequality have been exacerbated. “From the mid-90s until 2019, the level of Peruvians living below the poverty line dropped significantly, but many of those people had informal jobs,” reflected Hawkshaw, noting that when the pandemic hit, government-imposed lockdowns left a large section of society without the means to provide for their families. “Inequality and poverty, which cause disenchantment, have been enflamed by Covid,” he added. Tellingly, Peru’s key mining regions overwhelming supported Castillo, underscoring how tensions have risen after years of conflict between mining firms and the local communities. In provinces such as Cotabambas, Espinar and Chumbivilcas, over nine out of 10 people voted for Castillo, election data

showed. Strong support for Castillo was also apparent where new mining sites are being built, including 86.3% of the vote in Torata, where Anglo American’s Quellaveco mine is currently under construction, and 96% of the vote in Haquira, where First Quantum plans to invest US\$1.8 billion in a copper project.

## Will pre-election rhetoric result in tangible change?

Castillo has previously criticized mining firms for “plundering” the country’s wealth, and has pledged to redraft Peru’s constitution and redistribute profit. However, this raises the point of what is rhetoric and what will convert into real policy. “I do not think we will get to a point of resource nationalization, and we will not see expropriation,” suggested FTI Consulting’s Michael Cullen, drawing parallels to the situation when former president Ollanta Humala came into power in 2011. “The economic reality of the situation dictated that he got straight into bed with the corporate element of society, despite having ties to Chávez and rising to power through leftist rhetoric,” Cullen recalled.



*It is not possible to think about fiscal consolidation and sustainable growth without the mining sector, and this needs to be understood by our country’s authorities.*

**- Claudia Cooper, President, Lima Stock Exchange (BVL)**



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Acknowledging that the current situation might seem similar to the period before Humala was elected, political commentator and CEO of Viceversa Consulting, Oscar Díaz, warned that there are two fundamental differences from the context today. "First, Humala signed a roadmap towards the second round of the election, which represented a moderation of his discourse. Second, he never threatened to close the congress, nationalize industries, or disregard international agreements, like Castillo is doing."

However, Díaz agreed that Castillo will not be able to nationalize the mining industry, as nationalization implies paying huge amounts of money to the affected companies. On June 27th, Castillo stated his willingness to reappoint the head of the country's central bank, Julio Velarde, in a market-friendly move which indicates a path of moderation may be possible. Furthermore, Perú Libre will have to contend with a divided Congress.

"Politicians in Peru are similar to politicians all over the world. They promise a number of things, but do not realize that there are checks and balances in place. In the case of Peru, this means the conformation of Congress," reflected Roque Benavides, chairman of Buenaventura.

Orlando Marchesi, country senior partner at PwC Peru, stated that it will be almost impossible for Castillo to carry out any expropriations, as the Congress, which was elected during the first round of presidential elections in April, is made up

by a majority of parties which favor the market economy and private investment as the main driver of the economy. This sentiment was echoed by Claudia Cooper, president of the Lima Stock Exchange (BVL) and former finance minister, who emphasized the mining sector's role in both short-term recovery and long-term macroeconomic stability: "It is not possible to think about fiscal consolidation and sustainable growth without the mining sector, and this needs to be understood by our country's authorities."

According to the IMF, Peru is expected to experience the strongest recovery in Latin America in 2021 (9% growth), but this will be put in jeopardy if protectionist policies that do not attract foreign investment are implemented. Speaking in February, Michael Scherb, founder and CEO of Appian Capital Advisory LLP, stated that he would like to increase Appian's position in Peru, where the company's head of Latam and COO (Igor Gonzales, formerly of Sierra Metals) is based. However, he warned: "I speak with the ministers of mines of many countries, and we are clear with the point that our capital will go to the path of least resistance and best risk-reward."

If Peru is to rebound successfully from the economic devastation caused by Covid-19, a middle ground will have to be found between Castillo's ideals and the financial reality of a country hugely dependent on its mining industry.

**Moving forward: The need for dialogue and collaboration**

With copper trading above US\$4/lb, the new administration is blessed with macro conditions as favorable for mining as anything seen since the previous super cycle that ended in 2011. Long term planning and collaboration are necessary to make the most of the country's natural resources. Currently, the sector consists of a mining portfolio of 46 projects totaling a value of more than US\$56 billion, and the geological endowment to increase this further.

Furthermore, an infrastructure deficit worth nearly US\$100 billion also offers an opportunity for economic revival. "The best way to fund infrastructure investment is through the income provided by mining, generating a virtuous circle for employment and development," reflected Víctor Gobitz, president of the Peruvian Institute of Mining Engineers (IIMP) and CEO of Antamina.

Although the Castillo election has been a shock to the country's mining community, the political circus of the previous three years, which saw three presidents and five mining ministers, has hardly been a beacon of stability. When the dust settles after the election, the hope is that the new regime will not disregard the positive work carried out by previous mining minister, Jaime Gálvez, who was a key figure in the formulation of the Vision of Mining to 2030, promoted by the Center for Convergence and Good Mining-Energy Practices (Rimay).

"It is important to re-start workshops that had to stop due to the pandemic, where mining companies, government authorities, NGOs and civil society came together to define the vision of mining in Peru for 2030," commented Luis Rivera,



*When you are elected as president and have to run a country whose economy is based on mining, you need to start making alliances and thinking about improving mining development, otherwise the economy will fail.*

**- Fernando Pickmann,  
Partner,  
Dentons**



Gold Fields' executive vice president of the Americas.

Expanding on this point, Víctor Gobitz elaborated: "The mining industry is so important to the country that there should be a defined mining policy, in the same way Peru has solid tax policies and macroeconomic policies. This would assure continuity regardless of government changes."

Streamlining permitting should be top of the agenda for the next mining minister, with adjustments to the prior consultation law of paramount importance to stimulate investment into early-stage exploration. "It is essential that political leaders establish consensus and guarantee an environment of stability, predictability and compliance with deadlines," said Jorge León Benavides, president of the Canada Peru Chamber of Commerce (CCCP).

Soaring metals prices in 2021 have been a catalyst for renewed optimism, and a mature, well-run mining industry with a deep pool of local talent puts Peru in the

position to rebound strongly in 2021. Whether this potential is realized is another question, and the first months of the Castillo administration will give an indication of what can be expected moving forward.

2021 is more than just an election year for Peru, it is also recognized as the bicentennial anniversary of the country's independence. However, Roque Benavides believes that the real bicentennial anniversary of Peru's independence is, in fact, in 2024, 200 years after the last battle against the Spaniards was fought. On that note, he gave a final message to the Peruvian mining community: "In these next three years, the private and public sectors have to work together to take advantage of the opportunities in front of us," he said, imploring the industry to become more involved in civil society.

"I would say that Peru has a brilliant future," added Benavides, concluding that the election has shown the need to be more active in contributing to the well-being of the country. ■

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## Victor Gobitz

President  
PERUVIAN INSTITUTE OF MINING  
ENGINEERS (IIMP)



### What are the priorities of IIMP for 2021?

A key priority for the industry and the country is to tackle the pandemic. During the first wave, Peru was the only mining country that shut down mining operations, and that was a mistake. So, it is a priority to maintain the dialogue with the authorities during the second wave. Beyond this, we will have a new government taking over in July 2021. During this election process, the industry will have to be active to send its messages to the public. Over the last two years, we have seen two positive initiatives by the government, supported by IDB. The first one is the 'Rimay' initiative to define a vision of the mining industry towards 2030, an effort that needs to be continued now at a regional level. The second one was the creation of an inclusive working group to work on the industry's long-term sustainability. The mining industry is so important to the country that there should be a defined mining policy, in the same way Peru has

solid tax policies and macroeconomic policies. This would assure continuity regardless of government changes.

### To what extent do you think the presidential elections in 2021 could impact Peru's mining industry?

There is going to be a lot of noise. The campaign is going to be throwing lots of populist ideas to the public, and most probably the new government will not have control over Congress. Whoever is elected will need to have a very fluid communication with the different economic and political actors.

### What were the main themes of the IIMP's ProExplo virtual event in March 2021?

ProExplo is focused on the exploration segment. One of our objectives is that those in charge of public policy understand that exploration is a high-risk activity with a minimal environmental impact. Yet, the permits are similar to those that a mining operation requires.

## Claudia Cooper

President  
LIMA STOCK EXCHANGE (BVL)



### After a uniquely challenging 2020, what is the state of the Peruvian economy at the beginning of 2021?

The Peruvian economy has experienced a dynamic recovery since before the second lockdown in February 2021, which was not as strict as the first lockdown as a balance between economy and health was considered. This recovery has been due to two factors: first, there has been a huge monetary and fiscal injection into the economy; second, the Peruvian economy is very dynamic and volatile, with high levels of informality, which allows the country to adapt quickly to changes. According to the IMF, it is likely that Peru will experience one of the strongest recoveries in the region.

### What role do you see mining playing in Peru's economic recovery?

The mining sector is crucial for Peru's economic recovery and macroeconomic stability as it generates resources and investment, which at the same time attract more investment. It is not possible

to think about fiscal consolidation and sustainable growth without the mining sector, and this needs to be understood by our country's authorities.

### What do you think could be done to improve the climate for foreign investment in Peru?

Peru has experienced constant changes of policies in recent years. What the country needs, rather than more measures, is political stability and leadership, which needs to be built around a common vision. Mining needs to be included in this vision as a fundamental basis for the country's development. Once we have stable leadership and have decided which direction we want our country to go in, the right measures will come. On the economic side, it is necessary to continue promoting macroeconomic stability, commercial openness and private investment as an engine for development.

### Would you like to increase the participation of mining companies listing

If that is not addressed, we will continue seeing a decrease in exploration expenditures, which is highly damaging to a mining country like Peru.

### 2021 is the 200 year anniversary of Peru's independence. By the end of the year, what changes would you like to see in the country's mining industry?

Peru's geological richness offers huge operations like Cerro Verde, Las Bambas and Antamina, as well as narrow vein operations and artisanal mines. As a country, we need to promote large investments but also formalize the artisanal mining industry that is linked to gold production. It is estimated that half a million people are involved in artisanal mining, and this industry is not paying any taxes and is leaving a wide portfolio of environmental liabilities. This is the greatest challenge that needs to be addressed by the industry. ■

### on the BVL?

The BVL already has a strong participation from the mining sector, which represents almost half of all its listed companies. However, the Lima Stock Exchange's main challenge is that it does not have enough liquidity, which is a problem derived from a change in the capital markets. More liquidity will attract more companies, and this is a role that we have to share with the whole financial system.

### In February, IIMP announced Rumbo a PERUMIN 2021. Can you tell us about this series of events?

We decided to carry out Rumbo a PERUMIN as a combination of virtual and physical events to discuss how to build a common vision for the mining sector and to establish a minimum consensus. The objective is to make this event as decentralized and as inclusive as possible, with hybrid events in the main mining regions of Peru, including Arequipa, Apurimac and Cajamarca. ■

## Jorge León Benavides

President  
CANADA PERU CHAMBER OF  
COMMERCE (CCCP)



### What are the CCCP's main priorities in 2021?

We know about the financial problems many companies are facing in various sectors, therefore, our management is focused on providing them with various tools that allow them to get closer to potential clients and replace face-to-face networking opportunities with virtual opportunities. Moreover, we have created new working committees, such as the innovation and technology committee and the gender equity committee, that are added to the mining, energy, infrastructure, social media and sustainability committees.

### How is the CCCP promoting the Peruvian mining industry, and what can you tell us about your participation at PDAC 2021?

We have created various business platforms that will allow our partners alternative contracting of their products or services in a much more agile and direct way with mining companies. The CCCP also facilitates networking opportunities through one-to-one meetings we generate for our partners. As for PDAC, we are focused on maintaining the activities that Peru has offered year after year, which are highly recognized by executives and global investors.

### What issues are currently affecting the mining industry in Peru?

The expedition of permits and authorizations that allow mining exploration to start at the appropriate time is an issue that must be addressed. At present, they far exceed the times recorded in other mining countries. Adjustments need to be made to the Prior Consultation Law so that this is not an impediment to the development of mining projects. The eradication of illegal mining and the creation of better policies for mining formalization is also a pending task. The country is witnessing large investments paralyzed by conflicts with the communities and a lack of support from the central government (Río Blanco, Conga, Tía María). Peru has a significant portfolio of 46 mining projects totaling more than US\$56 billion, many of which are not being developed for various reasons at the speed required and needed.

Also, in a year marked by the presidential elections, it is essential that political leaders establish consensus and guarantee an environment of stability, predictability and compliance with deadlines, which will allow for the execution of investments.

### How could Peru improve its climate for junior exploration?

What has to happen is that the large mining companies regain market value, operational capabilities, and become aggressive investment companies, in such a way that they lead to risk investment, that is, exploration.

Likewise, one of the tasks that must be carried out by the government is administrative simplification, with all the rules and processes being clear and rational.

### What would you say makes Peru an attractive jurisdiction for mining investment?

Peru continues to be one of the most important mining addresses thanks to the volume of its reserves and the sustainability of its economic and legal policies. Furthermore, a good level of debt, dollar stability, international reserves, low country risk and optimal investor confidence are factors that maintain Peru as an attractive jurisdiction for investors. ■

**Peru At a Glance**

Source: IMF, data for 2020

- CAPITAL**
- Lima
- HEAD OF STATE**
- Pedro Castillo, Perú Libre
- GDP**
- US\$202.01 billion
- GDP GROWTH**
- 11.15%
- TOTAL INVESTMENT (% OF GDP)**
- 17.82%
- GROSS NATIONAL SAVINGS (% OF GDP)**
- 19.1%
- CURRENT ACCOUNT BALANCE (% OF GDP)**
- 1.5%

**Demographic Data**

Source: IMF, data for 2020

POPULATION  
**33.4 MILLION**

UNEMPLOYMENT RATE  
**6.2%**



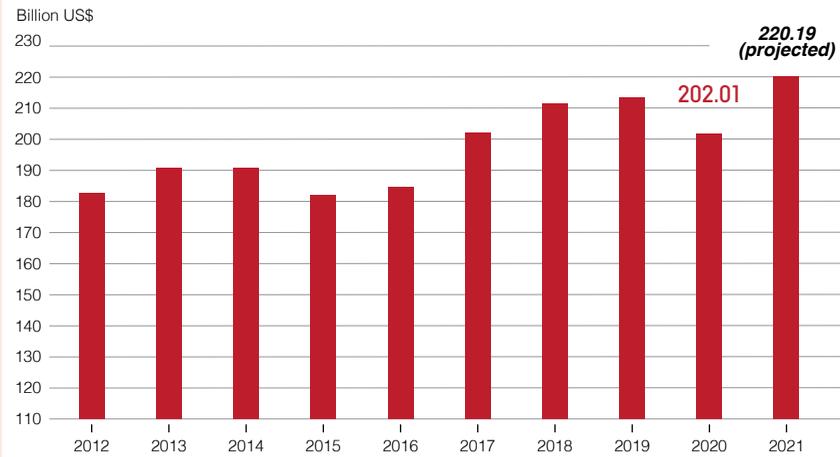
GDP PER CAPITA  
**US\$6,127**

GDP PER CAPITA (PPP)  
**US\$11,879**

INFLATION RATE  
**4.2%**

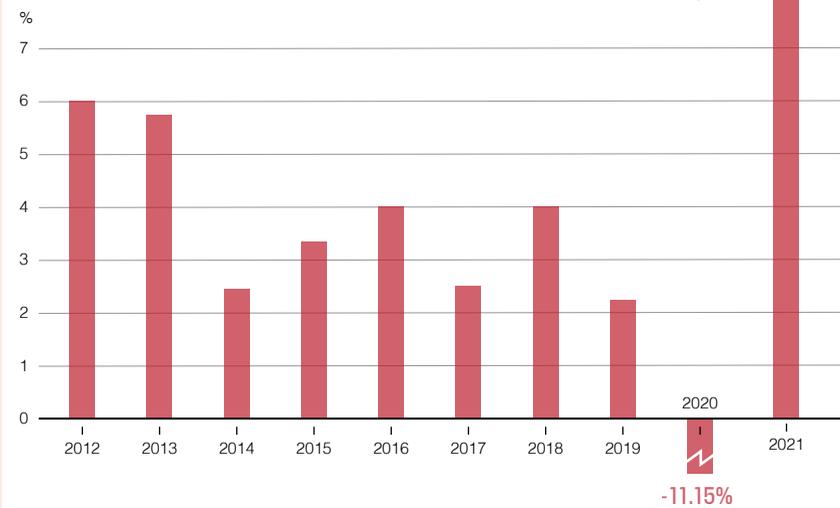
**GDP Evolution In US Dollar Value**

Source: IMF



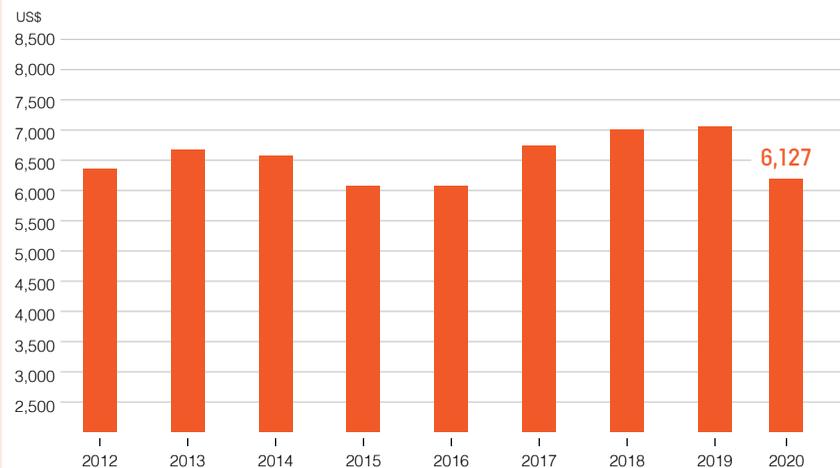
**GDP Growth**

Source: IMF



**GDP Per Capita In US Dollar Value**

Source: IMF



**Political and Social Analysis**



"Covid-19 has been the fuel on the fire of a long-standing and deep-rooted social and political problem in Latin America. Latam is home to 8% of the global population, but has accounted for 18% of Covid cases and 20% of Covid deaths. Why has the region performed so poorly in the face of the pandemic? Commentators have been quick to point out populist presidents in Brazil and Mexico who were skeptical of imposing lockdowns, however that was not the case in Peru which also suffered high death rates. There is something more endemic and pernicious at play, and the root cause is inequality."

**- Michael Cullen,**  
**Managing Director – Latin America,**  
**FTI Consulting**



"The current situation we are living in Peru might seem similar to the period before Humala was elected in 2011. Despite his radical discourse before the election, once he was elected, he understood that re-founding the country was not feasible and that he had to play by the rules of democracy. There are two fundamental differences with the context today: First, Humala signed a roadmap towards the second round of the election, which represented a moderation of his discourse. Second, he never threatened to close the congress, nationalize industries or disregard international agreements."

**- Oscar Díaz,**  
**CEO,**  
**Viceversa Consulting**



"Most of the areas where the big mining companies operate remain extremely poor. Therefore, many communities surrounding mining operations are not fond of our market economy as it has not benefitted them. The problem is not the market economy, but rather that the regional and local governments have done a poor job of bringing prosperity to their communities. If we had more efficient government we would have been able to build better infrastructure, health and educational services over the last 20 years. Regardless of who wins the election, the system has to be reformed."

**- Orlando Marchesi,**  
**Country Senior Partner,**  
**PwC Peru**



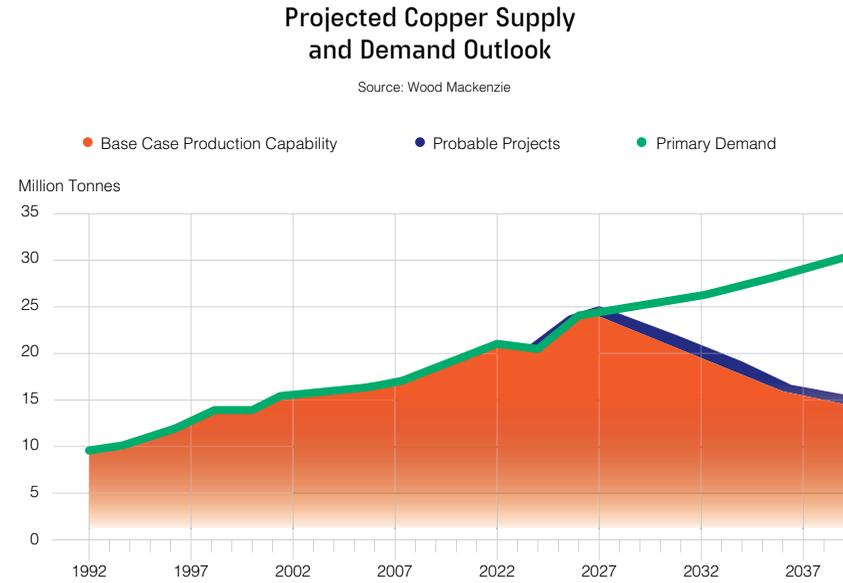
"Many companies in Peru that struggle with social licensing have been around for decades, and sometimes have a bad reputation due to legacy issues, or if they were in a region where there has been historical conflict between mining and communities. On the other hand, companies which have entered the Peruvian market recently have been successful in obtaining their social license to operate. Establishing good relationships with the community from the start is key to accelerate the process."

**- Marcial Garcia,**  
**Partner and Mining Lead,**  
**EY Peru**

# Peru's Copper Opportunity

THE METAL OF THE FUTURE IS ALREADY THE METAL OF THE MOMENT

"Copper is the new oil," stated Goldman Sachs in May 2021, citing a surge in green capex combined with the lack of copper mining projects as the factors that will lead to a multi-year bull market. Trafigura, the world's biggest copper trader, sees the red metal hitting US\$15,000 a ton (US\$7.50/lb) in the coming years, according to head of copper trading, Kostas Bintas. "Copper demand is going to be psychedelic," proclaimed Robert Friedland, speaking at Mines and Money London in November 2020 (caveat: he also sells copper). Precious metals producers are on the hunt for copper deposits, with Barrick chief Mark Bristow describing it as "a fantastic strategic asset". Producers of other base metals, such as zinc-focused Nexa Resources, are looking to develop copper projects. In the case of Nexa, its Magistral greenfield property in Ancash



is expected to move into production in 2024, according to CEO of Nexa Peru, Ricardo Porto, who stated: "There is a lot of talk about a commodities supercycle and the one commodity that is indisputably linked to this cycle is copper." Quite simply, everyone is bullish on copper, and for good reason. From infrastructure-based government stimulus packages, to 'the green reset' where Europe and the USA are all aligned in their plans to move away from fossil fuels, the transition will be driven by copper, supplying material for solar, wind, energy storage systems, electric vehicles (EVs) and EV charging stations.

Global EV + PHEV (Plug-in Hybrid Electric Vehicle) sales reached 3.24 million in 2020, compared to 2.26 million for 2019, and are expected to rise to over 21 million units by 2030. The average petrol engine vehicle requires 20 kg of copper, a hybrid 40 kg, and a plug-in EV 109 kg, while the cars of the future will need as much as 163 kg of the metal. As an example of how quickly the switch towards EVs could be completed, in July 2021 the European Union proposed an effective ban for new fossil-fuel cars starting in 2035. Although the mid to long-term consensus on copper is favorable, few could

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Peru produces 2.5 million tonnes of copper annually, so every cent the copper price goes up represents an additional US\$50 million in revenue. It is an opportunity the country cannot miss.

- Rómulo Mucho, General Manager, Pevoex



have predicted how quickly demand would pick up in the short-term, particularly in the context of a global pandemic where economic growth has been sluggish at best. Surging demand from China and dwindling copper warehouse stocks sent the red metal to an all-time-high in May 2021, with futures trading over US\$4.80, a remarkable figure less than a year since copper had cratered to 4-year low of US\$2.10/lb in March 2020. Peru, as the world's second largest copper producer, will undoubtedly benefit from rising prices. However, there is a pervasive feeling that the country could produce a lot more than it currently does. Multiple large-scale projects remain undeveloped, stuck in a quagmire of permitting complications and community conflicts. Even projects with permits in hand, such as Tia María – the poster-child of undeveloped Peruvian mining assets – are not guaranteed to get the green light, as emphasized by former president Martín Vizcarra, who stated that the project would never be developed under his administration. If the struggle has been difficult under moderate governments, how much worse could it get under Castillo? Which bank would fund a project when the State is threatening to take 70% profit?



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“Peru produces 2.5 million tonnes of copper annually, so every cent the copper price goes up represents an additional US\$50 million in revenue. It is an opportunity the country cannot miss,” stated Rómulo Mucho, general manager of Pevoex and president of Agromin 2021. The event, taking place in November 2021, looks at creating synergies between mining and agriculture, two industries with intrinsic links to local communities.

Indeed, unification should be the operative word for the newly elected Perú Libre regime, as conflicting interests have contributed to an unstable political backdrop. Marcobre’s Mina Justa moved into production in July 2021, and combined with Anglo American’s Quellaveco, due to start in 2022, Peru has a platform to produce 3 million tonnes of copper annually by 2023. However, ironing out social conflicts and establishing a semblance of political continuity will be key for Peru to continue this upward trend and close the supply gap with Chile.

**Stimulating Project Development**

With copper trading above US\$4/lb since February, free cash flow is expected to fuel expansions, technology investments, exploration and M&A. In addition to the need to make up for time lost during the 2020 lockdown, there is some urgency for Peru to expedite project development and take advantage

of the momentum that high metals prices bring. Not only to aid economic recovery, but also because the country’s post-Quellaveco pipeline lacks major greenfield projects.

Money alone will not be enough to ensure projects are given the green light, as lengthy permitting processes and social tension have resulted in a number of high-quality projects being held back.

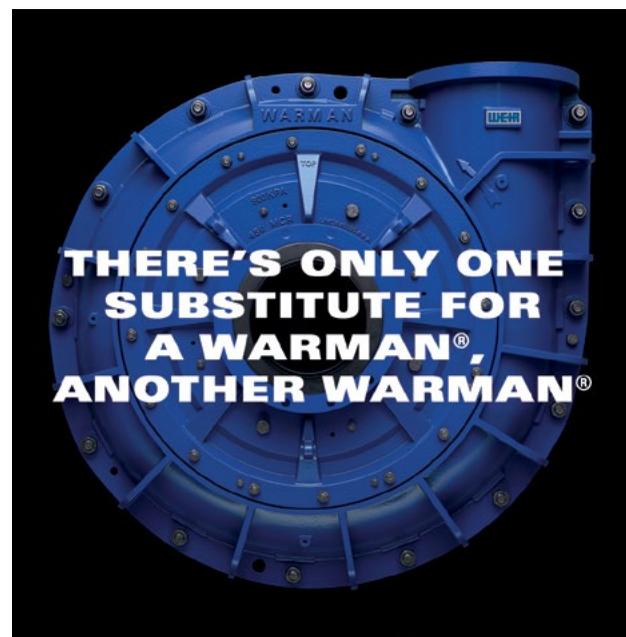
“The government does not think mining deserves a dedicated State policy, and that damages the industry’s prospects. Investment arrives in countries with legal and political stability,” observed Rómulo Mucho, who added that a dedicated, proactive State policy could expedite projects which would yield good returns.

These projects include Jinzhao Mining’s Pampa de Pongo, particularly attractive with iron ore trading over US\$200 per tonne, and the Río Blanco mine in Piura, which would add over 200,000 mt/y of copper, but mining is pretty much banned in this region of Northern Peru, according to Mucho. Even areas where mining is widely accepted, such as the mining corridor of southern Peru, have seen road blockades which caused a loss of sales worth more than US\$500 million to MMG-Las Bambas.

Another of Peru’s copper producers with a project subject to a judiciary process is Southern Peaks Mining (SPM) and its Ariana asset. Adolfo Vera, SPM’s president and CEO, weighed in on the matter: “Ariana is a project that SPM will definitely build, as I have always maintained, because there is no technical support for any of the claims of those who oppose the project.” SPM hopes to be able to restart construction by the end of 2021, with production to start by the end of 2022. Vera stated that once in production, Ariana will be a low cost producer, adding 20,000 mt/y copper concentrate to the company’s profile.

The importance of stimulating project development goes far beyond the royalties and taxes paid to the government, as the largest projects create vast ecosystems of suppliers, who in turn provide for their families, generating wealth spent in industries such as agriculture, hospitality and consumer goods. A large percentage of the 120 companies interviewed for the 2021 edition of GBR’s Peru Mining publication are actively working on Anglo American’s US\$5 billion capex Quellaveco project, from engineering through to equipment components, catering and maintenance. Copper is often talked about in macro terms – the role it will play in the energy transition – but the jobs it creates also sustain countless families on a micro level in countries such as Peru and Chile.

Discussing the progress of Quellaveco, Tom McCulley, CEO of Anglo American Peru, revealed that construction was 50% complete as of May 2021, and mining ore should start by the end of the year. The mine is expected to be fully operational in 2022. “Since I have been here, I have seen the tremendous opportunities that Peru’s mining sector presents, and I think this should be emphasized more than it is,” stated McCulley. “As an industry we need to sit down with government and figure out how we are going to capture this opportunity to benefit the Peruvian people. If we are not careful, and too many restrictions are introduced, future investment is going to dry up or go somewhere else.” ■



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**Tom McCulley**

CEO  
ANGLO AMERICAN PERU

**What is the status of the Quellaveco development, and when do you expect production to start?**

Covid has created a lot of challenges, particularly from a logistics standpoint, but our team and contractors have handled it as well as possible. For instance, we do approximately 500 random Covid tests per week, in addition around 3,500 to 4,000 pre-boarding PCR tests per week. From an overall construction standpoint, Quellaveco is now over 50% construction complete (as of May 2021). On the operational side, we have had four autonomous trucks running for over two months now, with one shovel up and running and a second shovel set to be commissioned in July. We expect Quellaveco be fully operational in 2022. The exact date is Covid dependent to some degree, but this is a goal we expect to achieve. We should start mining ore by the end of 2021, as the project transitions from construction to operation.

**Can you tell us about Anglo American’s agreement with ENGIE Energía Peru to provide renewable energy to Quellaveco via the Punta Lomitas wind farm?**

We sat down with ENGIE Energía Peru just before Covid to start talking about what opportunities we have for green energy, and the deal was put together in the span of less than a year. This sends a message to the mining industry and to Peru that renewable energy is feasible, and we are very proud to be the first mine in the country that powers its entire operation via renewables. Quellaveco will require approximately 187 megawatts, and even on a global level there are very few mines of this scale that source 100% of their energy from renewable sources. We are very glad to support additional investment in Peru and the agreement we have with Engie will provide more jobs to the people of Peru.

**How do the Caterpillar 794 AC autonomous mining trucks using Command for Hauling at Quellaveco compare to traditional vehicles?**

At the moment we are going through a learning curve to see how we can get the best out of the trucks. For example, when the shovel operator fills up a manual truck, if he overflows the load it does not matter, but with an autonomous truck it does matter, because if you drop a rock in the way of an autonomous truck it will not operate as it will detect a hazard. However, we expect a significant productivity improvement in the coming months and years, especially when all the trucks become autonomous. We expect between a 10% to 30% improvement in productivity compared to a traditional fleet.

At Quellaveco we also made a commitment to the community, that even though we are using autoumous trucks we will still hire the same amount of people as we would in a manual operation, but some of the jobs will be different than before and we will train the people to be able to work in an digital mine.

**What are some of Anglo American’s initiatives to increase the participation of women at its operations?**

Across the company this has been a big focus and we are at about 25% participation of women at Quellaveco. It is important to create an inclusive environment where all workers feel comfortable.

**What message would you give about the importance of fostering a collaborative mining climate in the country?**

Since I have been here I have seen the tremendous opportunities that Peru’s mining sector presents, and I think this should be emphasized more than it is. As an industry we need to sit down with government and figure out how we are going to capture this opportunity to benefit the Peruvian people. If we are not careful and too many restrictions are introduced, future investment is going to dry up or go somewhere else. All stakeholders should have a fair share, make a fair profit, and have access to development. I think we have done a good job of this at Quellaveco, and this is a good example of how we need to do things moving forward. ■

We are very proud to be the first mine in Peru that powers its entire operation via renewables.



## Anthony Hawkshaw

President & CEO  
BEAR CREEK MINING

Considering that mining in Peru represents over 10% of the GDP and 60% of the export earnings, I do not expect there will be drastic changes to the legislation affecting mining.

### What is the current status of the financing package for the Corani project (June 2021)?

We continue to work with BNP Paribas and Société Générale, who we engaged in 2020 to arrange a senior secured credit facility. The main commercial terms of the financing have essentially been agreed, and the different parties have completed their due diligence. The independent engineers will be able to sign off on their technical due diligence report after a site visit, but the recent outbreak of the Delta variant of Covid in the Arequipa region has delayed this slightly. This part of the Corani project financing will be in the order of US\$400 million to US\$425 million at good commercial terms.

We are also negotiating a subordinated debt facility that would bolt on to the senior credit facility. The intercreditor arrangements are the subject of discussion as to who disperses first, who gets repaid first, and how they get repaid out of the project cash waterfall. As part of the subordinated debt package we will probably enter into a long-term concentrate offtake agreement, which will secure our market for several years. The balance of the Corani project financing will be raised by equity.

### To what extent has the political situation in Peru impacted the climate for mining investment in the country?

In my opinion, considering mining in Peru represents over 10% of the GDP and 60% of the export earnings, I do not expect there will be drastic changes to the legislation affecting mining. There may be incremental increases in the tax burden, but the principal enshrined rights in the constitution – such as property ownership and the free movement of currency – will not be changed. It will take the capital markets some time to absorb all of this, but Peru remains a good destination for mining investment, with a far stronger bond rating for its sovereign debt than any other South American country except Chile.

In many of the major mining regions in Peru Pedro Castillo received a large majority of the votes. Do you think the anti-establishment senti-

### ment in these regions is an image issue, or more deep rooted?

I think it is more deeply rooted. From the mid-90s until 2019, the level of Peruvians living below the poverty line dropped significantly, but many of those people had informal jobs. Then the pandemic hit, the GDP dropped by over 10% and government-imposed lockdowns left these people without the means to make money. Inequality and poverty, which cause disenchantment, have been enflamed by Covid.

### What work has Bear Creek been doing to support the Chacaconiza and Quelcaya communities?

Over a long period of time we have helped them develop their alpaca herds and improve the quality of the wool, to the point where the average family income had gone from US\$50/month in 2011 to US\$700/month in 2019. However, the alpaca market was drastically affected by Covid. We have been able to provide some employment on various projects, including building a power line, where we have completed seven towers of a proposed 17. We have also provided educational material, radio signals and internet access so that the children can study from home. Once the power line is completed, we will put up fiber optic cable which will eventually spread to all of the local communities.

### Where would you like to see Corani by the middle of 2022?

I would like to see a substantial amount of the heavy civil work done, the pioneer camp virtually complete, detailed engineering complete, and major equipment ordered – some of which ready to be delivered. We also intend to augment Bear Creek's in-house team, and have recently hired a new project director and a health and safety manager. We will need further reinforcements in HR, environmental specialists, engineering, metallurgical and communities relations staff.

In summary, I would like to see an organization with around twice as many people as we currently have, managing a heavy civil works contractor and getting ready to line the water ponds at Corani. ■

## Sustainability

### MORE THAN A BUZZWORD, ESG HAS BECOME THE OVERARCHING THEME IMPACTING ALL FACETS OF MINING

Is mining sustainable? The depletion of a finite resource that cannot be renewed is, in essence, the antithesis of what many consider sustainability. However, mining is fundamental to a sustainable future in the transition to an electrified green economy that is growing incrementally. For this transition to happen at the pace necessary to combat the impacts of climate change, a greater acceptance of the mining sector is a necessity. In this context, sustainability in mining is about doing things better and

proving that an industry with a checkered history can operate in a responsible manner.

Has modern mining cleaned up its act? For those within the industry, this goes without saying. However, ask the families of the 270 people killed during the Brumadinho tragedy in 2019, or the Puutu Kunti Kurrama and Pinikura communities whose 46,000-year-old Aboriginal site at the Juukan Gorge was destroyed in 2020, what they think of the sector.

Incidents such as Brumadinho and Juukan Gorge are the ones that make the news and capture media attention. Furthermore, the organizations responsible are not small backwater operators, but two of the three biggest mining companies by market cap in the world.

A commodities note written by Daniel Litvin for the Financial Times on June 7th titled "Prepare for a 'supercycle' in anti-mining activism" suggested that new waves of social opposition set to hit the industry may change it for the better. Litvin argued that the common thread linking

the challenges surrounding mining is ESG as a route to building stronger relationships with customers and investors, rather than just a way to reduce criticism.

Indeed, rather than being an afterthought at the back of company PowerPoint presentations, ESG is now at the forefront of corporate strategy. A report from Morningstar released in April revealed that sustainability-focused funds attracted record inflows during the first quarter of 2021, pushing global assets under management in ESG funds to nearly US\$2 trillion.

"Financial institutions are finally putting their money where their mouth is," affirmed Michael Cullen, managing director Latin America for FTI Consulting, giving the example of a mining project in Peru he worked on where a European and an American banking institution were about to stop financing due to environmental and human rights issues. "If you are a junior mining company hoping to fake it till you make it before being bought out, that is not going to happen, as a deep ESG audit will be performed to ensure that you

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comply with their very high international standards.”

Michael Scherb, founder and CEO of Appian Capital Advisory LLP, weighed in on the subject: “Today, ESG comes up in nearly every interaction with investors. It used to be a buzzword, then it became a checklist, and now it has become a real thematic in underwriting,” he said, explaining that it is an educational process, walking institutional investors (like pension plans and sovereign wealth funds) through the good that mining does in the world. “This is not just about decarbonization and commodities, which is everyone’s focus, but involves communities, jobs, health and infrastructure investment in remote parts of countries which may not usually receive benefits,” added Scherb, remarking that a lot of sectors can learn from mining’s ability to bring different stakeholders together as part of a final product.

The International Council on Mining and Metals (ICMM) has set out a list of Mining Principles, created on the understanding that the decarbonizing of the global economy and meeting the UN Sustainable Development Goals (SDGs) requires a sustained demand for metals and minerals over the coming decades.

“The mining sector is the backbone of the transition to a net zero emissions economy,” stated Rohit Dhawan, new ICMM CEO, who brings a wealth of sustainability-focused experience to the role. Dhawan cited the World Bank estimate that there will be a 500% growth in the demand for critical minerals required for this transition. To underline the importance of the mining sector, he gave the example that if the UK alone was to convert all its petrol and diesel cars to electric cars today, it would take up twice the annual global production of cobalt. “Therefore, mining will be a fundamental pillar of vehicle electrification, and for the production of other important elements to reach carbon neutrality such as solar panels or wind turbines.”

Dhawan went on to emphasize that the way minerals are produced is also important. In the past, mineral production contributed 4-7% of global greenhouse emissions.

Achieving tangible change will require the buy in of the full mining supply chain, including the engineering firms and consultancies that design projects and advise on environmental and social strategy. In

April 2021, multinational EPCM Ausenco released its first sustainability report. Alexandra Almenara, Ausenco’s VP environment and sustainability for South America, outlined what the report hopes to achieve: “Its aim is to compile all our sustainability efforts in different projects and areas of the company, and with this constitute a baseline for our commitment to the future,” she said, adding that once all the independent sustainability initiatives within the company are understood, Ausenco can start working on more specific, unified and company-wide measures.

Gonzalo Covarrubias, general manager of WSP Peru, explained how the company’s consulting services aim to create long-term relationships between project, community and operation, suggesting that the mining industry has not been great at communicating its role in supplying global demand for sustainable technologies. “We need to clearly communicate why we mine metals – as they are vital for development; and how we mine metals – by having a responsible mining and strong relationships within the communities that we operate.”

Covarrubias emphasized the need to communicate with local communities, governments, clients and employees in unison rather than in silos, accentuating the importance of long-term planning that considers climate change, wealth-creation for communities and how technologies will evolve.

American multinational conglomerate 3M is involved in the full lifecycle of mining projects, providing consumables such as PPE and electrical solutions for connectivity and energy. Luis Palenque, 3M’s president and managing director for the Andean Region, mentioned that the company invests more than 6% of its global income into innovation, which represents over US\$2 billion per year, with sustainability at the core of its R&D. “3M’s sustainability strategy includes new objectives, such as achieving 30% less carbon emissions within the next 10 years, 30% less water consumption by 2030, and zero-carbon footprint by 2050. To help achieve this, the company has already invested US\$1 billion towards reaching its sustainability goals,” detailed Palenque, noting that even as a customer, 3M selects suppliers and companies based upon how sustainable they are.

## Renewable Energy Sources

In April 2021, ENGIE Energía Perú, the Peruvian arm of French multinational electric utility company ENGIE, announced it will build a wind farm to supply power to Anglo American’s Quellaveco mine, making it the first Peruvian mine to use 100% renewable energy. Rik De Buyserie, country manager of ENGIE in Peru and CEO of ENGIE Energía Perú, detailed that the 260 megawatt (MW) Punta Lomitas wind farm will provide approximately 187 MW of green energy in a two-part project.

“Firstly, we will convert the current PPAs (power purchase agreements) that we have in place into green PPAs; and secondly, we have signed a green PPA for eight years from 2029,” explained De Buyserie, noting that ENGIE will also build a 60 km transmission line to connect the wind farm to the national grid.

The Ministry of Energy and Mines (MINEM) granted the concession on the Punta Lomitas wind project for both generation and transmission, and ENGIE expects to start plant construction in the second half of 2021. De Buyserie elaborated on the environmental benefits of the project, stating that the Punta Lomitas wind project will reduce CO2 emissions by 230,000 mt/y.

He also underlined that ENGIE is building the wind farm without any subsidies from the government, adding: “It is great news for future development if you can be environmentally-friendly but also competitive from a cost perspective.”

Tom McCulley, CEO of Anglo American Peru, related that the deal with ENGIE was put together in the span of less than a year, with the two companies entering discussions just before the Covid outbreak in 2020. “This sends a message to the mining industry and to Peru that renewable energy is feasible,” he said.

Peru also has abundant solar energy sources, particularly in the south of the country, a source of power that has dramatically reduced in cost in the past decade. A report from the International Renewable Power Agency (IRENA) presented data showing the global weighted-average LCOE (levelized cost of electricity) of utility-scale solar PV is set to fall to US\$ 0.039/kWh in 2021, lower than any fossil fuel-generated source. In addition to their environmental benefits, renewables are now becoming an economically sound alternative. “We

are currently evaluating the possibility of using solar power for San Gabriel, which has an ideal location to benefit from such an energy source,” revealed Roque Benavides, chairman of Buenaventura.

## Sustainable Wealth Creation and Community Expectation

“The social side of ESG – poverty – is often neglected,” stated Barrick’s CEO Mark Bristow, citing a World Health Organization (WHO) report forecasting that 100 million people will move below the breadline (US\$1.90 per day) because of Covid. “Companies that think simply ticking boxes is enough to raise money are in for a rude awakening, as the pandemic has highlighted that the world is not a platform for exploitation,” he added.

The majority of regions where mining is prevalent remain poor, despite companies and their shareholders making huge profits. It is one of the reasons why anti-mining sentiment exists, and one of the reasons politicians like Pedro Castillo rise to power. After it has been mined, copper does a number of good things, but its extraction presents the moral issue of global benefit vs local cost. One of the most tangible ways to eradicate poverty is through the construction of wells and pipes to supply water to third world communities, giving single mothers the chance to care for their children or work rather than walk miles to collect water each day. However, the local

cost of the mining process is its environmental impact in Andean communities that have not seen their fair share of the wealth created by generations of mining. Herein lies the challenge of obtaining and maintaining a license to operate.

Orlando Marchesi, country senior partner at PwC Peru, believes that many of the social challenges to mining in Peru are the result of a decentralization process that started in 2003.

While the country’s poverty incidence rate fell from 58 to 23 percent between 2004 and 2014, a large portion of the tax generated from mining has not been reinvested properly. He pointed to the lack of project management capabilities of regional governments, which have not been able to invest the Canon Minero (50% income tax generated from Peruvian mining companies) correctly.

“This has created conflicts between the mining companies and local communities,” he said, noting that unspent funds provided to regional governments (between 30% to 40% of the total paid) are returned to the Ministry of Economy and Finance. Stating that both the regional and local governments have done a poor job of bringing prosperity to their communities, Marchesi reflected: “If we had more efficient governments, we would have been able to build better infrastructure, health services and educational services over the last 20 years.”

Javier Del Río, VP business unit South America for Hudbay Minerals, gave an il-

lustration of the situation faced by poor communities in Peru, using the example of the Chumbivilcas province, which has 83,000 inhabitants in a remote location over 4,000 m above sea level. “In the region 29 out of 1,000 children do not celebrate their first birthday due to the high rate of infant mortality. On the environmental side, 62% of the garbage and waste in the region is buried, burned or dumped into water sources. In other words, the area is in need of tremendous help.”

Hudbay intends to bring in a multi-stakeholder approach that delivers investment to Chumbivilcas from many sources, and signed a framework agreement in March 2021, committing to invest 11 million Peruvian Soles (around US\$3 million) per year in social and technical development projects. However, Del Río warned that the task requires support from more than just the private sector: “Regardless of who wins the election, sustained investment and development is needed in the Chumbivilcas province, and this cannot be achieved by one company alone.”

The hope for Peru, its mining industry and local communities is that the experience of mislaid promises and legacy issues is part of a learning curve that leads to clearer communication from the early stages of a project. Castillo’s Perú Libre government has been elected with a mandate to distribute wealth more evenly, but to achieve this, collaboration rather than demonization is a must for a country that relies on its mining industry. ■

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## Rik De Buyserie

CEO  
ENGIE ENERGÍA PERÚ



Mining will continue to require significant amounts of energy, but if this can be supplied through greener sources, the industry will be able to change the perception some people have of it.

**ENGIE Energía Perú recently announced it will build a wind farm to supply power to Quellaveco, making it the first Peruvian mine to use 100% renewable energy. Can you provide details of this agreement?**

The agreement between ENGIE and Anglo American will mean that the entire energy supply of the Quellaveco project, which is approximately 187 MW, will be 100% green energy. This power project will make Quellaveco the first mine in Peru which secures 100% of its electricity needs through renewable sources from the beginning of the mine operation.

In order to be able to produce the green energy that the mine will require, we will be building a 260 MW wind farm in south-central Peru. We will also build a 60 km transmission line to connect the wind farm to the national grid. The concession on the Punta Lomitas wind project has already been granted and we expect to start plant construction in the second half of 2021. Siemens Gamesa will be providing the wind turbines for the project and is a key partner for ENGIE in this investment.

**What are the environmental and cost benefits of installing renewable energy, such as wind turbines?**

The Punta Lomitas wind project is a game changer for ENGIE. Looking at the 2,500 MW installed capacity we have in Peru, which represents approximately 20% of the installed capacity in the country, around 300 MW is currently from renewable sources. Therefore, with the 260 MW wind farm project we are almost doubling our renewable energy source capacity.

In 2017, we decommissioned our diesel fuel plant in Ilo, which was the first plant we bought when we started operations in Peru. Taking this plant out of the system reduced our CO2 emissions by 1 million tonnes per year (mt/y). In 2018, we inaugurated our first 40 MW solar plant, which avoids 52,000 mt/y of CO2 emissions. By the end of 2022, we will decommission our 135 MW coal plant, the only one in Peru, which

will reduce CO2 emissions by 850,000 mt/y. The Punta Lomitas wind project will avoid CO2 emissions by 230,000 mt/y. To summarize, in a very short period of time, we are eliminating approximately 2 million tons of CO2 emissions per year, while at the same time avoiding 300,000 mt/y of CO2 emissions through generating energy from renewable sources.

As well as being environmentally friendly, there is also a positive financial impact. The south of Peru and north of Chile have abundant solar resources, but Peru also has a couple of wind sites which are world class.

**Are power projects such as Punta Lomitas just applicable for multi-billion dollar operations such as Quellaveco, or can they be scaled down for small and medium-sized mines as well?**

The beauty of renewable energy projects is that they are flexible and can be scaled to fit the size of the operation. Renewable energy plants are much more modular than fossil fuel plants, as increasing capacity can be done through just adding another solar unit or wind turbine. ENGIE Energía Peru has approximately 1,000 MW renewable energy projects in its pipeline, and this is the company's focus for the foreseeable future in Peru.

**To what extent do you think the utilization of green energy could help the mining industry improve its image?**

Because of the nature of mining activities, the industry consumes a significant amount of energy in various forms. In recent years, there has been a shift towards more sustainable forms of energy consumption, with Quellaveco leading the way for the rest of industry to follow. Mining will continue to require significant amounts of energy, but if this can be supplied through greener sources, the industry will be able to change the perception some people connect with it. Mining is a necessity, and if it can be done in a sustainable way, it is a win for the communities, the companies that need a license to operate, the environment, and the Peruvian economy. ■

## Rohitash Dhawan

CEO  
INTERNATIONAL COUNCIL ON MINING & METALS (ICMM)



**What role can the mining industry play in the transition to a net zero emissions economy?**

Mining will be a fundamental pillar of vehicle electrification and for the production of other important elements to reach carbon neutrality such as solar panels or wind turbines. The way these minerals are produced is also important. We cannot afford to have excessive carbon emissions from mineral production.

The ICMM is working on both sides of the equation: we are studying how the industry can supply the metals and minerals required for the low carbon transition and analyzing how to do this generating the fewest possible greenhouse emissions. Several mining companies have successfully transitioned to 100% renewable energy, such as Anglo American in several parts of their operations. The Escondida mine is also well on track to achieve 100% renewable energy.

**What are the ICMM's current priorities?**

The main priority is to continue enabling the global industry to take up the Global Industry Standard on Tailings Management. Towards that end, we recently launched the Tailings Management Good Practice Guide as well as the Conformance Protocols for the Global Industry Standard on Tailings Management. Our ambitious goal is to find solutions that will significantly reduce or eliminate tailings in the first place.

There are two other areas we are currently working on: our skills initiative, which is a 15-year plan to equip communities with the skills they need to thrive, no matter what mining looks like in the future, and the Innovation for Cleaner, Safer Vehicles (ICSV), designed to reduce greenhouse gas emissions from mobile equipment on the mine site and reduce fatalities and injuries caused by mobile equipment. This year, we will also work in areas related to climate change and biodiversity. ■

## Michael W. Scherb

Founder & CEO  
APPIAN CAPITAL ADVISORY LLP



**In January 2021, the completion of the Appian Natural Resources Fund II was announced for US\$775 million. How was the fund raised and where will it be deployed?**

Fund II has the same strategy as Fund I, but on a slightly larger scale, as we can offer more credit and royalties. We have guiding macro themes that have been in place for over five years now, such as electrification, for example. However, there is no real chase for commodities as we are technically focused, targeting bottom-up fundamentals of an asset. We managed to deploy 45% of Fund II during Covid, which proves you are still able to get good deals done despite what commodity prices are doing.

**Which jurisdictions is Appian looking at, and what factors do you take into account when weighing up country risk?**

I speak with the ministers of mines of many countries, and we are clear with the point that our capital will go to the path of least resistance and best risk-reward. Latin America is the most important region for Appian, and 70% of our capital is invested there. We would like to increase Appian's position in Peru and Mexico.

**How has the importance of ESG in the mining space evolved from an investment standpoint?**

ESG used to be a buzzword, then it became a checklist, and now it has become a real thematic in underwriting. It is an educational process, walking institutional investors (like pension plans and sovereign wealth funds) through the good that mining does in the world. This is not just about decarbonization and commodities, which is everyone's focus, but involves communities, jobs, health, and infrastructure investment in remote parts of countries which may not usually receive benefits. A lot of sectors can learn from mining's ability to bring different stakeholders together as part of a final product. ■



# MINING PRODUCTION

"To optimize your production, it is important to know in real time the specific characteristics of the ore that is going through your processing plant, so the operator can provide the best metallurgical response possible"

- Javier Del Río,  
VP Business Unit South America,  
Hudbay Minerals Inc.



# Copper Production

## COPPER PRODUCTION IN PERU DECREASED IN 2020, BUT A REBOUND HAS STARTED IN 2021

After three years of steady copper production, where Peru's annual output averaged 2.45 million tonnes per year (mt/y) from 2017 to 2019, the Covid-induced lockdown in 2020 caused production to decrease by 12.5% to 2.15 million mt/y, according to figures from the Ministry of Energy & Mines (MINEM). Despite this expected drop, figures from October to December revealed production in Q4 2020 was almost identical to the corresponding quarter in 2019; an illustration of the recovery and a positive sign for 2021. There was a change to the leaderboard of Peru's largest copper producers in 2020, as Southern Copper Corporation took the top spot (up from third in 2019) with 423,796 mt/y, accounting for 19.7% of the country's output. As

Southern was the only company able to keep producing throughout lockdown, its position should come as no surprise. However, the copper major also benefited from a first full year of production after the expansion of its Toquepala mine. "The new concentrator at Toquepala added 100,000 mt/y of copper contained in concentrates, which represents approximately an increase of 30% in our production capacity," revealed Oscar González Rocha, Southern's president and CEO. Antamina (a BHP-Glencore-Teck-Mitsubishi joint venture) remained in second place, with 396,247 mt/y, followed by previous leader Cerro Verde, the mine operated by Freeport McMoRan in Arequipa, with 387,928 mt/y. Las Bambas, operated by MMG, was the

fourth biggest copper producer with 312,776 mt/y. Cerro Verde and Las Bambas both suffered 18.2% drops compared to their 2019 production, in contrast to fifth place Chinalco, which grew by far the most of Peru's top 10 copper producers, reaching 202,771 mt/y, a 6.7% increase from its 2019 mark.

Peru experienced sharp growth in its copper production between 2014 and 2017, moving from an annual average of less than 1.5 million mt/y to 2.45 million mt/y. After a period of stability preceding the new decade and the black swan event of 2020, a near-term pipeline is about to come online which will push annual production towards 3 million mt/y.

Minsur's Mina Justa operation is due to start commercial production in July 2021, and once ramped up will add 100,000 mt/y of copper, including 58,000 mt of copper cathodes. Anglo American's Quellaveco will contribute 300,000 mt/y and is expected to start production in 2022.

Mina Justa, Peru's newest copper mine, is operated by Minsur's subsidiary Marcobre, and has two plants – one for oxides and one for sulphides. Gonzalo Quijandría, Minsur's corporate affairs and sustainability director, elaborated on the processes to be used for each plant:

"In the case of oxides, we are using a new production process for Peru, which

is VAT leaching. Taking advantage of our proximity to the sea, we are using untreated seawater for the leaching process. In the case of sulphides, we have a conventional sulphide concentrator plant."

Acknowledging the impact Covid had on Las Bambas' production in 2020, general manager Edgardo Orderique spoke of the opportunity it presented to accelerate the implementation of technologies, such as the company's recently inaugurated Digital Operations Center (DOC) in Lima. "Our DOC has the aim of operating Las Bambas from Lima, controlling the whole value chain, from the mine to the Matarani port," he explained, adding that the current mini DOC controls dispatch as well as trucks, shovels and drillers, but MMG aims to extend this control to the transportation of concentrate and the storage points.

Orderique went on to outline the company's plans to begin operating the Chalcobamba pit in June 2021: "Our goal is not to expand production, but rather, to compensate for the lower copper grades at the Ferrobamba pit as we drill deeper and to achieve sustained production in the coming years" he said, noting that after Chalcobamba, MMG will continue development at SulfoBamba.

Another of Peru's main copper producers, Hudbay Minerals (TSX: HBM), also highlighted technological advances that have been implemented to optimize its operations. Javier Del Río, Hudbay's VP business unit South America, explained that to optimize production, you need to know in real time the specific characteristics of the ore that is going through your processing plant so the operator can provide the best metallurgical response possible.

"Right now, we are taking advantage of the US\$4/lb+ copper price to invest in capital initiatives focused on the optimization of all the processes from the pit to the port," he said, giving the example of particle size sensors that send data in real-time to optimize the processing plant throughout the Expert System. "We are also looking to automate our drill rigs so they can be operated remotely, and reinforcing our digital infrastructure with an LTE net-

work, including at Pampacancho."

Hudbay completed the pre-stripping phase at its Pampacancho satellite deposit in 2021, and expects to achieve full production at Pampacancho by the end of Q2, revealed Del Río, but commented that the real benefits of the operation will be felt in 2023/24. "This deposit will overcome the declining head grade at Constancia and compensate the hardness of the Constancia rock. Pampacancho has 40 million tonnes of reserves at 0.60% Cu, which will be blended with the Constancia production resulting in an average grade of 0.40% to 0.45% Cu for our operation, so it will contribute considerably."

One of Peru's private copper producers, Southern Peaks Mining (SPM), is in the process of expanding its Condestable mine in the Cañete province. The staged expansion of Condestable will initially increase throughput from 7,000 mt/d to 8,400 mt/d, with construction for this stage due to be finished in Q3 2021, revealed Adolfo Vera,

SPM's president and CEO. Vera noted that this will result in a 20% increase in copper production from the mine, before adding that the following stage will be to increase throughput to 12,000 mt/d after SPM has prepared a new EIA and obtained the necessary permits.

On the subject of the surging copper price, Vera mentioned that the context gives SPM a robust case for expansion. "This will bring about cheaper capital for brownfield copper projects, and has also stimulated M&A interest," he said. Although Vera stated that an IPO is not a short-term priority for SPM, he admitted that listing is on the cards in the not so distant future. Summarizing where he would like to see the company in 2022, Vera added: "I would like to see Ariana back in construction, Condestable's first expansion fully completed, and the permitting process underway for the second stage of the expansion. In an ideal world, I would also like at least one more asset in the SPM portfolio." ■

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## Edgardo Orderique

General Manager  
MMG-LAS BAMBAS

Our Digital Operations Center (DOC) has the aim of operating Las Bambas from Lima, controlling the whole value chain, from the mine to the Matarani port.

### How has Las Bambas modified its operations to adapt to remote work?

Due to Covid, we found an opportunity to sustain our operations with the least amount of workers possible at the operations. We found that many tasks can be carried out from home or from our recently inaugurated Digital Operations Center (DOC) in Lima. In fact, 10% of our personnel – 180 workers – are currently working remotely.

Other remote technologies have also gained traction. For example, with virtual reality it is possible to have a 'digital twin' of the mine. We expect to use this technology soon for the Ferrobamba pit.

### Can you elaborate on the inauguration of Las Bambas' Digital Operations Center (DOC) in Lima?

Our DOC has the aim of operating Las Bambas from Lima, controlling the whole value chain, from the mine to the Matarani port. This mini DOC currently has the control of the dispatch as well as trucks, shovels, drills, etc., and we aim to extend this control to the transportation of concentrate and the storage points. We currently use a private 4G LTE communication platform in our operations and plan to integrate all the operations using this technology since the DOC to have an automated data collection supported by an advanced analytics platform to help optimize decision making. We are also conducting a number of tests to allow stable information to travel at a very high speed in real time.

### Las Bambas has suffered blockades that have interrupted the export of copper concentrates. What do you think has led to this situation?

The blockades are mainly due to claims of environmental origin related to the transit of the trucks that transport the concentrate, as well as commercial and labor expectations. MLB has a major highway maintenance program from its operations to the point of transfer, to the train. Likewise, the trucks that work with us must comply with Euro5 requirements and are subject to a rigorous maintenance program. Both programs allow us to minimize dust, noise and CO2 generation. In the environmental

monitoring carried out by an independent authority, it has been verified that the standards established for these measurement parameters are met.

On the other hand, our Local Business Development program has resulted in the hiring of a significant number of local companies that provide us with goods and services. Likewise, we have a significant number of workers from the Apurimac region. However, we consider that existing expectations exceed our ability to hire local companies and workers, so we must redouble our efforts to contribute with the different levels of government (local, regional and local) to improve the living conditions of the communities in our region.

### What is the timeline for Chalcobamba's development?

We plan to begin operations at the Chalcobamba this year once we have the requested permits. Our goal is not to expand production, but rather, to compensate for the lower copper grades at the Ferrobamba pit as we get deeper and to achieve a sustained production in the coming years. After Chalcobamba, we will continue development at Sulfobamba pit. Chalcobamba provides better copper grades during the first years of its operation and it will be an open pit mine operation whose mineralogy and metal contents are very similar than Ferrobamba pit.

### What are the main goals of MMG-Las Bambas in Peru for the coming years?

Las Bambas has to incorporate sustainability into its operations, which will be achieved through several projects. To achieve these goals, we will invest approximately US\$2 billion in the next five or six years, as well as obtaining environmental permits and social agreements with the local communities.

We will also undergo extensive exploration inside the 35,000-hectare land package we have at Las Bambas, between the future Sulfobamba pit and the current Ferrobamba pit. We have geophysical information in this area whose results show interesting anomalies in the region, indicating the presence of copper. Our goal is to drill this area to obtain actionable information that could lead to further expansion. ■

## Javier Del Río

VP BUSINESS UNIT SOUTH AMERICA  
HUBBAY MINERALS INC.



We have 150,000 hectares of concessions in Peru, and option agreements with various companies, so there is no lack of potential to crystalize opportunities and grow our presence in the country.

### Which investments is the company making at Constancia?

During 2021 we have thus far completed the pre-stripping phase at the Pampacancha satellite deposit, which represents a capital expenditure, and have begun mining the first of two stages at this site, contributing towards our P&L. Keep in mind, Constancia is not the finish line, as we have several greenfield and brownfield deposits around the mine and in other parts of the country which we intend to explore thoroughly to increase reserves and resources.

### When do you expect the Pampacancha satellite deposit to begin full production?

We expect to achieve full production at Pampacancha by the end of Q2 2021, but the real benefits of the operation will be felt in 2023/24. This deposit will overcome the declining head grade at Constancia and compensate for the hardness of the Constancia rock. Pampacancha has 40 million tonnes of reserves at 0.60% Cu, which will be blended with the Constancia production resulting in an average grade of 0.40% to 0.45% Cu for our operation, so it will contribute considerably.

### Can you elaborate on introducing new technologies at Hubbay's mines?

Waste and ore can have over 30 different characteristics that must be considered, including hardness, head grade, contaminants, oxidation, clays, among other factors like mineralogy, units of compression and abrasion, etc. Waste needs a classification for NA (non-acid generating material) and PAG (potentially acid generating material), Units of compression, etc. To optimize your production, it is important to know in real time the specific characteristics of the ore that is going through your processing plant, so the operator can provide the best metallurgical response possible. Now, imagine if the system could recalibrate itself in real time to provide the best metallurgical response possible and the system learning from these responses.

Right now, we are taking advantage of the US\$4/lb+ copper price to invest in capital initiatives focused on the optimization of all the processes from the pit to the port that is help-

ing us to improve our recoveries (especially with the ultrafine material) and in particle size sensors that send data in real-time to optimize the processing plant throughout the Expert System. We are also looking to automate our drill rigs so they can be operated remotely, and reinforcing our digital infrastructure with an LTE network, including at Pampacancha. Importantly, these are not isolated activities, as the operation must work as an interconnected unit and not in silos.

### What progress has been made with the Chumbivilcas negotiations, and what investments does Hubbay have planned for the region?

Chumbivilcas has 83,000 inhabitants in the province, in a remote location over 4,000 m above sea level. In the region, 29 out of 1,000 children do not celebrate their first birthday due to the high rate of infant mortality. On the environmental side, 62% of the garbage and waste in the region is buried, burned or dumped into water sources. In other words, the area is in need of tremendous help, and Hubbay is trying to bring in a multi-stakeholder approach that delivers investment from many sources. We signed a framework agreement with the province in the beginning of March 2021, committing to invest PEN 11 million (around US\$3 million) this year in social and technical development projects, despite the other more than PEN 19 million (USD 5.2 million) the company annually invests in the three districts of its influence area. Regardless of who wins the election, sustained investment and development is needed in the Chumbivilcas province, and this cannot be achieved by one company alone.

### What opportunities does Hubbay see for growth in Peru, either organically or through M&A?

Hubbay is always looking to grow in both ways. This involves working on a range of projects simultaneously, which each have different criteria, including operational improvements, exploration campaigns and feasibility studies. We have 150,000 hectares of concessions in Peru, and option agreements with various companies, so there is no lack of potential to crystalize opportunities and grow our presence in the country. When the timing is right, we will execute. ■

## Gonzalo Quijandria

Corporate Affairs and Sustainability Director  
MINSUR



Mina Justa has a planned production life of 16 years, and over this time it should contribute around US\$1 billion if you put together income tax, royalties and the 8% profit distribution among workers.

### What is the status of the commercial production start at Mina Justa?

We are completing the commissioning phase with some production of concentrates and cathodes, with commercial production scheduled for the end of June 2021. We have two plants to process oxides and sulphides. In the case of oxides, we are using a new production process for Peru, which is VAT leaching. Another innovative aspect is that, taking advantage of our proximity to the sea, we are using untreated seawater for the leaching process. In the case of sulphides, we have a conventional sulphide concentrator plant.

### How is sea water being used at Mina Justa?

We have a sea water extraction point at our port and a pipeline that runs in parallel to our sulfuric acid line. Just a tiny portion of the water is desalinated for conventional camp water use. Water is pumped 41 km from the Pacific Ocean to our operation.

### Can you elaborate on your initiatives to promote sustainability in the mining value chain?

As members of ICMM, we are evaluating a number of initiatives to reduce our carbon footprint as well as our consumption of strategic resources such as water. This is what initially led us to design our process to use sea water. We are also looking at ways of using more sustainable and renewable energy sources.

### How do you think mining companies in Peru can improve their public image?

The industry has to be aware of its impacts. For instance, Mina Justa is located between two natural reserves: San Fernando and San Juan. So, Mina Justa shows that a mining project can operate with total respect for the natural and cultural richness around it. Our footprint is totally controlled and there is no impact on the natural reserves, and indeed we collaborate with these reserves to promote tourism in the area. We also want to help public authorities to better manage the financial resources that they get from the Mining Canon (50% of the income tax paid annually) through

initiatives such as public-private partnerships. With current metal prices, tax revenues will increase, but the authorities need to manage these resources efficiently to execute public works.

### What are the company's investment plans for the San Rafael mine considering the strong outlook for tin?

Minsur's San Rafael mine continues to be the largest single tin producer in the western hemisphere. The main development there has been the B2 project for tailings re-processing that started production late 2019. The tin grade we had in our tailings was higher than the grade found in any other new project in the world, and on top of the economics, this helped us implement a circular economy project. Before B2, we had also implemented an ore sorting technology, which helped us improve production. Now, we continue exploration in some adjacent areas to San Rafael.

### Once Mina Justa is fully optimized, what will it mean financially for the region of Ica and its communities?

Mina Justa has a planned production life of 16 years, and over this time it should contribute around US\$1 billion if you put together income tax, royalties and the 8% profit distribution among workers. We believe this will be a meaningful contribution to the Peruvian economy.

### Do you have a final message about the importance of Mina Justa to Peru?

Minsur is a mining company with a long trajectory. From being an important producer of tin and gold, we are now becoming a copper producer, and this is taking us to a different level. As members of the ICMM, we follow the best industry standards and we are committed to reducing our impact and our carbon footprint. Latin America is experiencing moments of change and a certain degree of political uncertainty, but our vision has always been for the long term, and in this particular case, the current copper price shows that our planning was right. Also, we are inspired by being able to contribute to a better world, as copper is a key metal in new technologies and renewable energies. ■



## Adolfo Vera

President & CEO  
SOUTHERN PEAKS MINING (SPM)

### What progress has been made with the planned expansion at Condestable?

The process of certifying the reserves and resources got delayed in 2020, as we were relying on a Canadian firm and they were not able to visit due to the travel ban. In Q4 2020 we restarted process with local engineering firm, BISA, and by April 2021 the basis of studies for the expansion will be ready. The staged expansion at Condestable will initially increase production from 7,000 tonnes per day (mt/d) to 8,400 mt/d, and construction for this stage should be finished in Q3 2021, which will result in a 20% increase in copper production from the mine. The next stage after this will be to increase production to 12,000 mt/d after we have prepared a new EIA and obtained the necessary permits.

### What is the current status of Ariana, and can you elaborate on the company's plan to increase investment in the project by US\$15 million to around US\$140 million?

Ariana is subject to a judiciary process right now, which we hope will be resolved in 2021. There was an additional hearing in August 2020, but the judge has not make a decision yet, so we have decided to keep the project suspended for the time being. Ariana is a project that SPM will definitely build, as I have always maintained, because there is no technical support for any of the claims of those who oppose the project. The increase in investment we are considering relates to a number of upgrades including a dry tailings deposit. By the end of this year we will hopefully be able to restart construction, with production to start by the end of 2022. Ariana will be a very low cash cost producer in the neighborhood of US\$0.50/lb, and will increase production by 15,000 mt/y fine copper equivalent, about 35,000 mt/y of copper concentrate.

### Would SPM consider acquiring another project to add to its portfolio?

The current high copper price, led by the astonishing Chinese recovery from the pandemic that does not seem to be slowing down, gives us a much more robust case for expansion. This will bring about cheaper capital for brownfield copper projects, and has also stimulated M&A interest. We are looking at properties in Peru and Chile, and to a lesser extent Ecuador and Argentina, and we are waiting for the opportunity to add another asset to SPM's portfolio. However, right now we are focusing more on operating assets rather than exploration or M&A, as is it the area we can add the most value in the short term.

### SPM participated in the TSX Latam Mining Investor Day in August 2020. Considering the company's organic growth pipeline and current high copper price, is listing publicly on the cards?

We are IPO ready. SPM prepared for an IPO in 2017 but the market turned and we decided against listing, which was a good decision for us at that moment and in hindsight. We have kept the discipline of being IPO ready, but I do not see it as a priority in the short term for 2021, unless there is a particular bull run for small cap copper producers and it becomes undeniably attractive. That being said, listing publicly is certainly on the cards further down the line for SPM, in the not so distant future.

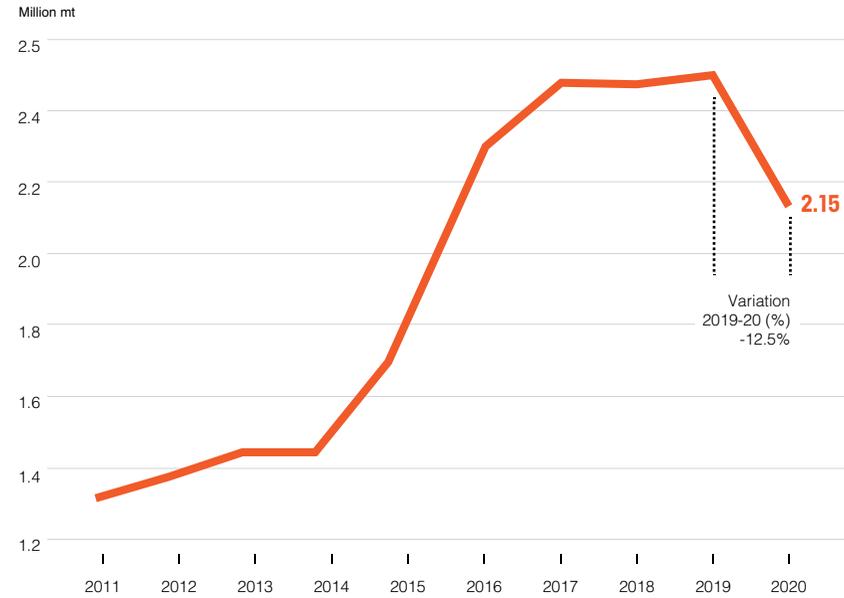
### Where would you like to see SPM by the beginning of 2022?

I would like to see Ariana back in construction, Condestable's first expansion fully completed, and the permitting process underway for the second stage of the expansion. In an ideal world, I would also like at least one more asset in the SPM portfolio. ■

By 2022, I would like to see Ariana back in construction, Condestable's first expansion fully completed, and the permitting process underway for the second stage of the expansion.

### Copper Production In Peru

Sources: MINEM / GBR



### Average Copper Price

Sources: LME / GBR



### Global Copper Reserves

Source: USGS

RANKING	COUNTRY	MINE PRODUCTION 2020 (KTONS)	COUNTRY	RESERVES 2020 (KTONS)
#1	Chile	5,700	Chile	200,000
#2	Peru	2,200	Peru	92,000
#3	China	1,700	Australia	88,000
#4	Congo	1,300	Russia	61,000
#5	USA	1,200	Mexico	53,000
#6	Australia	870	USA	48,000
#7	Russia	850	Poland	32,000
#8	Zambia	830	China	26,000
#9	Mexico	690	Zambia	21,000
#10	Kazakhstan	580	Kazakhstan	20,000
#11	Canada	570	Congo	19,000
	Other Countries	3,700	Other Countries	211,000
	World Total	20,190	World Total	871,000

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# Precious Metals

## HIGH PRICES ARE OFFSETTING A DOWNWARD TREND IN PRODUCTION

Gold and silver production in Peru suffered more in 2020 than the other metals the country produces, falling 32% and 22.5% respectively, according to MINEM figures. The dramatic reduction in gold, from 4.13 million ounces per year (oz/y) in 2019 to 3.08 million oz in 2020, and silver, from 136.17 million oz in 2019 to 105.49 million oz in 2020, can be partially explained by the majority of precious metals (PM) being mined from underground operations, which were impacted more by Covid restrictions than open-pit operations. However, it also follows a trend that has seen PM production in Peru decrease for five years in a row.

Fortunately, 2020 was a banner year for precious metals prices, with gold reaching an all-time-high in August, averaging US\$1,769/oz for the year, and silver approaching the US\$30/oz mark for the first time in eight years, averaging over US\$20 for the year. Q1 2021 saw a correction, as rising real rates caused gold to dip below US\$1,700/oz in March, but a revival in Q2 on the back of rising inflation has positioned precious metals for a promising second half of the year. Experiencing its best month since July 2020, gold closed over US\$1,900 in May 2021, with many expecting new all time highs before year-end.

While high PM prices are offsetting declining production in Peru, the news that the country's biggest gold mine, the Newmont-operated Yanacocha, decided to delay the construction of its US\$2.1 billion Sulfides project is a blow to the industry. The underground development of Yanacocha, as the mine transitions from oxides to sulfides, would represent the biggest single investment in Peru's mining industry in 2021 if given the green light, as well as signaling the move to large-scale underground mining in the country.

Roque Benavides, chairman of Buenaventura, which owns a 43.65% interest in Yanacocha, acknowledged that the political situation in Peru may have been a contributing factor to the postponement of the Yanacocha Sulfides development, but added that there were other factors in play. The technical complexity of the project is one aspect, as the size of the operation could lend itself to bulk mining methods such as block caving, a more capex-intensive option that can significantly lower waste disposal requirements.

Another standout gold development projects in Peru's pipeline is Buenaventura's San Gabriel, which should be in production by 2023, according to Benavides. He revealed that the permitting process is almost complete and noted governmental support for the project: "The authorities always reference San Gabriel when speaking about active projects in Peru's development pipeline," he said.

One international gold producer operating in Peru is South African major, Gold Fields. The company experienced a 25% drop in gold production at its Cerro Corona mine in 2020, but the operation remains hugely profitable, with the lowest running costs of Gold Fields' global operations. Luis Rivera, Gold Fields' executive vice president for the Americas, commented that despite the significant challenges posed by Covid, the company managed to establish the same production rate it had in December 2019 at its Cerro Corona mine in December 2020. Having previously completed a feasibility study to increase mine life at Cerro Corona to 2030, Gold Fields is currently undertaking a scoping study to extend this to 2034. Rivera explained that by using the mined-out pit at Cerro Corona as a tailings dam, the operation has gained extra space.

Rivera also elaborated on operational modifications and optimization work at the mine, including plans to recover the stripping waste in 2021 after activities had been reduced in 2020. The operation also plans to change its grinding circuit and 12-year-old crusher, as well as implementing a gravimetric circuit to recover additional coarse gold that was going to waste in the tailings dam. Rivera summarized the aim of the work being performed at Cerro Corona: "With these modifications we will have the appropri-

ate conditions to continue mining deeper and recover additional coarse gold that was going to waste because it was too heavy to be brought into the flotation circuit."

On February 16th, 2021, Barrick Gold announced it had reached an agreement to sell its 100% interest in the Lagunas Norte mine in Peru to Singapore's Boroo Pte Ltd for a total consideration of up to US\$81 million, plus the assumption by Boroo of Barrick's closure liability relating to Lagunas Norte of US\$226 million backed by an existing US\$173 million bonding obligation. In 2015, Lagunas Norte was producing over 500,000 oz/y at an AISC of US\$500/oz. However, with its reserves declining and the transition from oxides to more expensive sulfides, the asset no longer fitted with the company's strategy. Barrick CEO Mark Bristow said the sale was in line with the company's policy of selling non-core interests to focus on tier-one operations, and for Boroo it offers a platform into a country looking to expand its gold production. Boroo will now have the opportunity to extend the life of Lagunas Norte by accessing satellite resources and adapting the infrastructure.

### Growth Through Exploration

The difficulty in obtaining exploration permits in Peru, combined with declining reserves and ore grades, has heightened the need to support brownfield exploration. Brownfield expansions will also take on greater importance considering the lack of large greenfield projects in Peru's near-term development pipeline after Quellaveco. Free cash flow generated from high metals prices in the last 12 months is going back in the ground, as producers look to grow via the drill bit. Despite reducing its exploration spending by 48% in 2020, from US\$60 million per year to US\$32 million, Peruvian precious metals producer Minera Poderosa (Poderosa) was the company with the highest exploration investment in Peru last year. "In terms of greenfield and brownfield exploration, we are investing US\$8-10 million a year to find new deposits," revealed Marcelo Santillana, Poderosa's general manager.

From a production standpoint, Poderosa was the second biggest gold producer

in Peru in 2020, accounting for 9.4% of the country's production, according to MINEM figures. The company's aggressive exploration strategy has been key to its output and is set to continue in the years ahead. "Poderosa is currently preparing environmental impact studies for the Las Defensas brownfield project in La Libertad. Once the case studies and procedures have been completed, an investment of US\$68 million will be made to explore an area of 7,000 hectares," detailed Santillana, who estimates that production at Las Defensas will begin in four to five years.

Ignacio Bustamante, president and CEO of Hochschild Mining, stated: "Brownfield exploration remains the most important pillar of Hochschild's strategy," noting that in 2020, the company managed to attain additional resources at its Inmaculada mine in Peru and San José mine in Argentina.

"Our aim is to have additional inferred resources to present to the market by the time we publish our mid-year 2021 report," said Bustamante, adding that the company intends to drill two more targets – Minascucho and San Francisco – in the second half of 2021.

While Hochschild has been investing in its Inmaculada and Pallancata properties in Peru, it has also been advancing exploration projects in North America through its partnerships with Skeena Resources in British Columbia, and most recently with NV Gold in Nevada. When asked whether political uncertainty in South America is increasing the likelihood of Hochschild diversifying its geographical footprint into North America, Bustamante responded: "The current political situation in Peru is a reminder that we cannot put all our eggs in one basket, and advancing agreements with juniors is a strategy to diversify the company and diversify risk. Indeed, I would say that potential investments outside of Peru have taken on more importance due to the political context."

Bustamante's words are a reminder that if Peru is serious about reversing the downward trend in its precious metals production, it must become a more attractive mining jurisdiction, otherwise international companies will invest elsewhere. This starts with incentivizing exploration, and Peru still has a lot to discover. ■



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## Luis Rivera

Executive Vice President  
AMERICAS, GOLD FIELDS



It is especially important to re-start workshops that had to stop due to the pandemic, where mining companies, government authorities, NGOs and civil society came together to define the vision of mining in Peru for 2030.

### Can you give us an overview of Gold Fields' activities in Peru in 2020?

Gold Fields saw the challenge of adapting to the new reality of social distancing, PPEs, different protocols and regulations. Even though operations slowed down in March 2020, we managed to resume our activity under these new conditions, learning that it is possible to operate safely during Covid. Our priorities last year included securing metal production, securing stripping activity and, to a lesser extent, securing the cost, as well as looking at other activities such as exploration in brownfield areas. The recovery has been strong, and we have managed to re-establish the same production rate we had in the past. In December 2020, we reached a similar production level to that of December 2019.

### Which operational modifications and optimization work has been done at Cerro Corona?

During 2020 we reduced stripping activities. The stripping waste will be recovered in 2021. We also plan to change the grinding circuit and our 12-year-old crusher. In addition, we are implementing a gravimetric circuit to recover additional coarse gold that was going to waste in the tailings dam. With these modifications we will have the appropriate conditions to continue mining deeper and recover additional coarse gold that was going to waste because it was too heavy to be brought into the flotation circuit.

### Can you provide details of the scoping study to extend the mine life at Cerro Corona to 2034?

We are using the mined-out pit as a tailings dam, which has been extremely useful to gain extra space. Because our land properties at Cerro Corona are small compared to the space, we need this extra area to place waste and tailings.

### Construction at the Salares Norte project in Chile started in January 2021. How significant is this project to Gold Fields and what is its timeline for development?

Salares Norte is an important landmark for Gold Fields, as it is fully owned and funded by our company and represents

a present-day mine of the future. It is constructed in an extremely isolated place in a high deserted region in Atacama at 4,600 m above sea level. From a technological point of view, this is particularly challenging, as it is far from the electrical grid. To solve this problem, the electricity requirement for the project will be met through a diesel plant, and for the first time, we will install a solar farm, which will initially cover 5% of our electricity demand and will reach 20% of our demand in the future.

Many of our activities in the pit, in the stockpiles and in the plant, will be controlled through a remote operational control center in Santiago. We have already finished 100% of the detail engineering, 25% of the project is already advanced, and the first metal is expected to come into production in Q1 2023.

### How has Gold Fields been helping local communities through the pandemic?

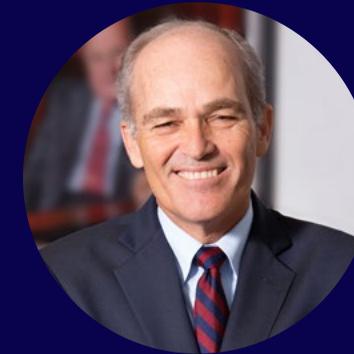
Gold Fields is currently implementing a large oxygen plant in the Bambamarca Hospital in Peru. We have also carried out several campaigns to promote the donation of oxygen, rapid testing, and food delivery, and we have worked together with the government to encourage social distancing and the use of masks. Gold Fields has also collaborated with educational authorities to raise consciousness about the importance of handwashing and cleanliness at home. In addition, we constructed two classrooms for the local school using local wood, to promote sustainable concepts in our kids.

### Where would you like to see Peru's mining industry by the end of 2021?

Hopefully, all activities will be resumed by the end of the year. It is especially important to re-start workshops that had to stop due to the pandemic, where mining companies, government authorities, NGOs and civil society came together to define the vision of mining in Peru for 2030. These dialogues were a useful initiative to establish a solid frame for mining activity and to achieve a consensus between different actors. ■

## Roque Benavides

Chairman  
BUENAVENTURA



Anything that can be decided by politics in Peru will require an evaluation of our competitiveness, comparing things such as taxation and permitting procedures to leading mining jurisdictions such as Canada, Australia and Chile.

### What are your thoughts on the current political situation in Peru?

Politicians in Peru are similar to politicians all over the world. They promise a number of things, but do not realize that there are checks and balances in place. In the case of Peru, this means the confirmation of Congress. The Peruvian system requires dialogue to reach consensus. A candidate can say what he/she wants to do, but turning this into legislation is another matter. There are some independent institutions in Peru which really work, and one of them is the Peruvian Central Bank (BCRP), which acts as the economic advisor of the Peruvian economy.

Anything that can be decided by politics in Peru will require an evaluation of our competitiveness, comparing things such as taxation and permitting procedures to leading mining jurisdictions such as Canada, Australia and Chile – countries that have been more successful than us in attracting investment. I hope that common sense prevails, and as the private sector we are actively working with politicians to convince them that this is the way forward.

### To what do you attribute the negative sentiment towards the mining industry in some regions?

There are a number of reasons why there is negative sentiment towards mining, one of which is expectation, and the government plays a role in this. I will give the example of Las Bambas. When Mr. Vizcarra was Minister of Transportation, he went to negotiate with the Cotabambas community and said that government was going to build a paved road, which never happened. This has led to years of conflict, with the mining company bearing the brunt of the blame.

Peru is a very centralized country, and many rural community leaders believe that mining is going to replace government in their regions, which is not realistic. The lack of management skills at the three levels of government – national, regional and provincial – is terrible in Peru. The private sector needs more dialogue to present and convince local communities of the benefits mining can bring, and government authorities

do not help in this respect. However, we have to be critical of ourselves before criticizing others, and as an industry I believe we can do better.

### How could Peru stimulate exploration and reverse the downward trend in gold production?

In Peru, exploration requires as many permits as putting a mine into operation, which is absurd - it can take six to eight months to get a permit to drill. By comparison, in Mexico it takes only three weeks. Mining companies have a responsibility to convince our authorities that exploration is research – it does not have a major impact on nature and it gives you a lot of information. What we are mining in Peru today are all deposits which have outcrops on surface. We have not discovered a hidden, deep deposit, but worldwide there have been a number of world-class discoveries at depth. Peru still has a lot to discover.

### What is the current status of the San Gabriel project, and when could this be moved into production?

San Gabriel is currently at the end of its permitting process. We started the prior consultation process two years ago, we continue having meetings with local communities, and the government keeps supporting its development as part of the economic reactivation after COVID-19. The authorities always reference San Gabriel when speaking about active projects in Peru's development pipeline. We are currently evaluating the possibility of using solar power for San Gabriel, which has an ideal location to benefit from such an energy source. The mine should be in production by 2023.

### Do you have a final message for the Peruvian mining industry, on the bicentennial anniversary of the country's independence?

I would say that Peru has a brilliant future. In these next three years, the private and public sectors have to work together to take advantage of the opportunities in front of us. We have to give opinion and become more involved in civil society. ■

# Ignacio Bustamante

President & CEO  
HOCHSCHILD MINING



### Which technological improvements have been made at Inmaculada?

The most important improvement project that we have for Inmaculada is the ore sorting facility, which will allow us to screen the material using a combination of different technologies such as laser, color and x-rays. We are currently in the process of finishing the engineering and starting the procurement for this plant, with the aim to be fully operational by Q1 2022. The plant will have a total capacity of 1,800 mt/d. This technology will allow us to increase the grade fed to the plant and improve the mechanization of our mining methods. It will also allow us to put value to other areas of the mine that were not profitable before.

### Where has Hochschild's recent brownfield exploration work been focused?

In 2020, we managed to attain additional resources at both Inmaculada and San José, and we are very excited about

the discoveries that we have seen at both deposits in 2021 as well. Our aim is to have additional inferred resources to present to the market by the time we publish our mid-year report. For the second half of 2021, we have identified two promising targets – Minascucho and San Francisco – which we intend to drill before year end.

### Why do you think anti-mining sentiment in Peru exists, and how can the private sector change this?

News and communication regarding the mining sector is often negative, since it is associated with illegal mining activities, and people tend to link the image of mining to all this terrible news. As a sector, we need to communicate better and educate the population about the positive impact the industry has for the country and its communities. I believe that the pandemic has highlighted many things the mining sector has done to support the economy, but there is still room for improvement. ■

# Marcelo Santillana

General Manager  
MINERA PODEROSA



### Poderosa's drop in gold production in 2020 was not as severe as that of other gold producers in Peru. What was this due to?

Although we had good results relative to other production companies in Peru, it was a challenging year. Poderosa has a rotation system, where workers spend 28 days in the mine and 14 days off. This system was stopped for about four months, as workers had to be isolated in the mine to avoid contagion, which affected our projections, especially in terms of exploration. We normally do 54,000m of drilling each year, but in 2020 we only achieved 48% of this goal. Also, whereas previously we had two or three people in the same room, we had to reduce this number to one person. Our company has accelerated the construction of new camps with portable houses ("igloos"), to house workers and isolate infected people; These constructions are expected to be completed by the end of May 2021.

### In 2020, Poderosa spent more on exploration than any other mining com-

### pany in Peru, according to MINEM figures. Can you explain this strategy and where will investment in exploration go in 2021?

The useful life of a mine is usually estimated at three years. Therefore, every year we have to make investments to replenish the mineral resources that we process. This investment represents around US\$60 million per year, but in 2020 we invested US\$32 million. Despite this, Poderosa has been the company with the highest investment in exploration in Peru, with grades of 18 grams per ton (g/t), demonstrating the profitability of the company. In terms of greenfield and brownfield exploration, we are also investing US\$8-10 million a year to find new deposits. Poderosa is currently preparing environmental impact studies for the Las Defensas brownfield project in La Libertad. Once the case studies and procedures have been completed, an investment of US\$68 million will be made to explore an area of 7,000 hectares. Our estimate is that we will start operations in four to five years. ■

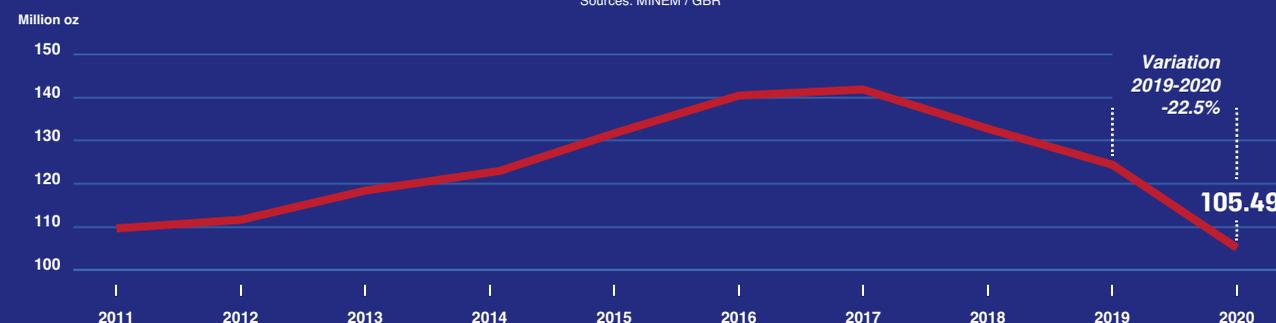
### Gold Production In Peru

Sources: MINEM / GBR



### Silver Production In Peru

Sources: MINEM / GBR



### Gold Average Price (USD/oz)

Sources: Kitco / GBR



### Silver Average Price (USD/oz)

Sources: Kitco / GBR



# Zinc



*The zinc market witnessed an oversupply of concentrate before the pandemic hit, which was later consumed by the smelters in China during the outbreak as supply struggled, especially in South America. At the moment, there is a supply deficit as expansion projects were delayed and no new mines were built. We expect this supply constraint to last several years, which will positively impact prices.*

**- Ricus Grimbeek, President & CEO, Trevali Mining**



THE BASE METAL KEY TO INFRASTRUCTURE DEVELOPMENT IS ENJOYING A STELLAR 2021

Zinc production in Peru decreased by only 5.3% in 2020, totaling 1.33 million metric tonnes (mt), thanks to the country's biggest producer increasing its zinc output by 34.3% (Antamina's 491,180 mt/y Zn accounted for over one third of all zinc produced in Peru in 2020). The base metal used to galvanize steel experienced a rollercoaster 2020, dropping to a 5-year low of US\$0.82/lb in March, before rising over US\$1.25/lb in December 2020. This upward trajectory has continued in 2021, with zinc passing the US\$1.38/lb mark in June, buoyed by the prospect of government stimulus packages involving heavy infrastructure spending.

Peru's second biggest zinc producer, Nexa Resources, saw a 24.2% drop in production in 2020, due to its operations being underground mines, which were slower to ramp up after lockdown than their open-pit counterparts due to government restrictions.

Ricardo Porto, president and CEO of Nexa Resources Perú, revealed that the company's focus on innovation helped Nexa weather the worst effects of the pandemic, and Nexa's aggressive expansion plans in Peru remain intact. The context has improved significantly in 2021, with the company achieving its third best quarterly result ever in the first quarter of the year, in part due to high metals prices, but also due to a process of restructuring the company has undergone since before the pandemic.

Nexa's restructuring program includes the introduction of new technology and

a revision of mining processes that have resulted in lower costs and higher productivity at its Cerro Lindo, El Porvenir and Atacocha mines and Cajamarquilla smelter, explained Porto, who mentioned that 70% of Nexa's innovation is incremental, focused on improving processes rather than replacing them.

On the subject of the zinc market, Porto stated he believes that the fundamentals have never been this strong. "The price peaked in 2017 due to a temporary supply shortage, but this was not backed up by the level of demand we are seeing now," he said, observing that demand is usually concentrated into certain regions at different times, but for the first time Nexa is seeing large volumes being requested globally, including in Latin America.

Regarding zinc's short-term outlook, Porto analyzed: "70% of the demand for zinc comes from infrastructure, and governments around the world have pledged to increase infrastructure spending in the wake of the pandemic,



Image courtesy of Nexa Resources

so the outlook remains robust for the rest of 2021."

This sentiment was echoed by Ricus Grimbeek, president and CEO of Trevali Mining, which operates the Santander mine located 215 km northeast of Lima. "At the moment, there is a supply deficit as expansion projects were delayed and no new mines were built. We expect this supply constraint to last several years, which will positively impact prices," reflected Grimbeek, noting that demand will likely remain solid as zinc is a raw material in solar panels and essential for galvanization and infrastructural developments, such as roads.

Expanding on Trevali's plans in Peru, he added: "We are also conducting some regional exploration as well as exploration below Santander to look for a possible extension of the current ore body. Therefore, the mine will be taken on an exploration phase by the end of Q1 of 2022, and as a result, a study will be conducted to expand the tailings facility." ■



## Ricardo Porto

President & CEO  
NEXA RESOURCES PERU



**We managed to achieve our third best quarterly result ever in Q1 2021, in part due to high metals prices, but also due to a process of restructuring the company has undergone since before the pandemic.**

### How did Nexa Resources' perform in Peru in Q4 2020 and Q1 2021?

The results from Q4 2020 and Q1 2021 were very positive. After lockdown, the strict protocols required to operate in Peru resulted in an adaptation period where no underground mining operation was able to return to 100% capacity. However, we managed to achieve our third best quarterly result ever in Q1 2021, in part due to high metals prices, but also due to a process of restructuring the company has undergone since before the pandemic. This includes the introduction of new technology and revision of mining processes that have resulted in lower costs and higher productivity.

### What is the status of the Magistral copper development project, and its timeline for development?

There is a lot of talk about a commodities supercycle, and the one commodity that is indisputably linked to this cycle is copper, which forms the basis of infrastructure development and will play a large role in the electrification transition. Considering this macro outlook, Nexa has a lot of interest in increasing its participation in the copper space, with Magistral being our most advanced project. We finished the detailed engineering and design of the open-pit mine at the end of Q1 2021. We are now in the final permitting phase, and hope to make a construction decision by the end of the year.

### What are your views on the current drivers of the zinc market?

I believe the fundamentals of the zinc market have never been this strong. The price peaked in 2017 due to a temporary supply shortage, but this was not backed up by the level of demand we are seeing now. Normally demand is concentrated into certain regions at different times, but for the first time we are seeing large volumes being requested globally, including in Latin America. 70% of the demand for zinc comes from infrastructure, and governments around the world have pledged to increase infrastructure spending in the wake of the pandemic, so the outlook remains robust for the rest of 2021.

### What is Nexa's strategy regarding the sustainable development of communities surrounding its operations?

Regardless of where you operate, you need to establish the sustainable development of local communities, and this has to be done by training a base of local talent which understands the culture. In some ways, Covid presented an opportunity to showcase what the mining industry can do for communities in terms of providing PPE, oxygen, food and health supplies at a critical time. However, the core of Nexa's strategy is forming partnerships with local stakeholders so they can work with us and become part of a project.

### Can you elaborate on Nexa's focus to promote workforce diversity and increase the participation of women in the mining industry?

Nexa is considerably above the industry average when it comes to workforce diversity, but there is still a lot of progress to be made. As a company, it is hard to communicate with society if you do not mirror society. Therefore we need more Peruvians, more workers from local communities, and certainly more women. Having a majority male workforce from a metropolitan area not only narrows your viewpoint, but also narrows the talent pool you are hiring from.

Nexa's Empodera Group has highlighted issues that have resulted in a number of organizational changes, including increasing maternity leave to six months in Peru, with flexibility to work the final two months part time. We are also running training programs at Cerro Lindo and the Cajamarquilla smelter to train female operators, and have readapted mine site infrastructure to create a more adequate working environment. For the mining sector to become more competitive, we have to attract more diverse talent. ■



# Peru's Main Producing Mines

NUMBER	MINERAL	COMPANY	MINE
1	Copper, Molybdenum, Silver, Lead, Zinc	Antamina (BHP-Glencore-Teck-Mitsubishi)	<b>Antamina</b>
2	Copper, Molybdenum, Gold, Silver	MMG-Guoxin-CITIC	<b>Las Bambas</b>
3	Copper, Molybdenum, Silver	Southern Copper	<b>Cuajone</b>
4	Copper, Molybdenum	Southern Copper	<b>Toquepala</b>
5	Copper, Gold, Silver	Glencore	<b>Antapaccay</b>
6	Copper, Molybdenum	Cerro Verde (Freeport-Sumitomo-Buenaventura)	<b>Cerro Verde</b>
7	Copper, Silver, Lead, Zinc	Nexa Resources	<b>Cerro Lindo</b>
8	Copper, Silver, Lead, Zinc	Nexa Resources	<b>El Porvenir</b>
9	Copper, Silver, Lead, Zinc	Nexa Resources	<b>Atacocha</b>
10	Copper, Silver, Lead, Zinc	El Brocal (Buenaventura)	<b>Colquijirca</b>
11	Copper, Gold, Silver	Southern Peaks Mining	<b>Condestable</b>
12	Copper, Molybdenum, Silver, Lead, Zinc	Chinalco	<b>Toromocho</b>
13	Copper, Silver, Lead, Zinc	Sierra Metals	<b>Yauricocha</b>
14	Copper, Silver, Molybdenum	Hudbay Minerals	<b>Constancia</b>
15	Gold, Silver	Yanacocha (Newmont-Buenaventura-Sumitomo)	<b>Yanacocha</b>
16	Gold	Boroo Pte Ltd	<b>Lagunas Norte</b>
17	Gold, Copper	Gold Fields	<b>Cerro Corona</b>
18	Gold, Silver	Buenaventura	<b>Orcopampa</b>
19	Gold, Silver	Caraveli	<b>Chacchuille</b>
20	Gold, Silver	Coimolache (Buenaventura-Southern-Espro)	<b>Tantahuatay</b>
21	Gold, Silver	La Zanja (Buenaventura-Newmont)	<b>La Zanja</b>
22	Gold, Silver	Pan American Silver	<b>La Arena</b>
23	Gold, Silver	Pan American Silver	<b>Shahuindo</b>
24	Gold	C.M. Horizonte	<b>Parcoy</b>
25	Gold, Silver	Retamas	<b>Retamas</b>
26	Gold, Silver	Laytaruma	<b>Laytaruma</b>
27	Gold, Silver	Aruntani	<b>Andrés</b>
28	Gold, Silver	Anabi	<b>Valeria</b>
29	Gold, Silver	Apumayo	<b>Apurimac</b>
30	Gold, Silver	Minsur	<b>Pucamarca</b>
31	Gold, Silver	Poderosa	<b>Poderosa</b>
32	Gold, Silver	Buenaventura	<b>Tambomayo</b>
33	Gold	Los Andes Peru Gold	<b>Isabelita (El Toro)</b>
34	Gold	Yanaquihua	<b>Alpacay</b>
35	Silver, Zinc, Lead	Buenaventura	<b>Uchucchacua</b>
36	Silver, Gold	Buenaventura	<b>Julcani</b>
37	Silver, Gold	Hochschild	<b>Inmaculada</b>
38	Silver, Gold	Hochschild	<b>Pallancata</b>
39	Silver, Gold	Hochschild	<b>Arcata</b>
40	Silver, Lead, Zinc, Copper	Pan American Silver	<b>Huarón</b>
41	Silver, Zinc	Pan American Silver	<b>Morococho</b>
42	Silver, Lead, Zinc	Fortuna Silver	<b>Caylloma</b>
43	Silver, Lead, Zinc	Volcan (Glencore)	<b>Cerro de Pasco</b>
44	Silver, Lead, Zinc	Volcan (Glencore)	<b>UAE Chungar</b>
45	Silver, Lead, Zinc	Volcan (Glencore)	<b>UAE Yauli</b>
46	Lead, Zinc, Copper, Silver	Glencore	<b>Yauliyacu</b>
47	Zinc, Lead	Trafigura	<b>Catalina Huanca</b>
48	Silver, Lead, Zinc	Casapalca	<b>Americana</b>
49	Silver, Lead, Zinc	Colquisiri	<b>María Teresa</b>
50	Lead, Zinc	Mitsui	<b>Santa Luisa</b>
51	Lead, Zinc, Silver	Buenaventura	<b>Mallay</b>
52	Zinc, Lead, Silver	Trevalli	<b>Santander</b>
53	Zinc	San Ignacio de Morococho	<b>San Vicente</b>
54	Copper, Silver, Lead, Zinc	Raura	<b>Raura</b>
55	Iron	Shougang	<b>Marcona</b>
56	Phosphate	Mosaic-Mitsui	<b>Bayóvar</b>
57	Tin	Minsur	<b>San Rafael</b>
58	Copper	Anglo American-Mitsubishi	<b>Quellaveco (under construction)</b>
59	Copper	Marcobre (Minsur-Alxar)	<b>Mina Justa</b>
60	Copper, Silver, Zinc	Southern Peaks Mining	<b>Ariana (under construction)</b>





# JUNIOR EXPLORATION

"Exploration is the essence of the mining industry. Mining companies have a responsibility to convince our authorities that exploration is research – it does not have a major impact on nature, and it gives you a lot of information"

- **Roque Benavides,**  
**Chairman,**  
**Buenaventura**



# The Junior Sector Reignites

## HIGH METALS PRICES MEAN DRILLS ARE TURNING AND NEW JUNIORS ARE LISTING

Although the downward trend in exploration expenditure in Peru continued in 2020, with a reduction of 37.5% compared to 2019, this does not tell the full story. It was a tale of two halves, as the crash in Q2 was followed by a dramatic rise in metals prices in Q3, led by precious metals, before base metals took over. By 2021, copper's relentless ascent and silver's mainstream coverage had spawned a number of new companies and a flurry of drill results.

Since stage two of Peru's mining reactivation plan allowed exploration activities to restart in July 2020, gold hit an all-time high of US\$2,076/oz in August, silver approached the US\$30/oz mark for the first time in eight years, and copper reached an all-time high in May 2021, trading over US\$4.75/lb. The fa-

vorable market conditions saw three new junior IPOs in Peru in Q4 2020, with Pucara Gold (TSXV: TORO) and Kuya Silver (CSE: KUYA) going public in October, followed by Element 29 Resources (TSXV: ECU) in December. This trend has continued in 2021, with Tier One Silver (TSXV: TLSV) listing in June, and Forte Minerals, Sombrero Resources, Silver X and Mantaro Silver all expected to list in the second half of the year.

Guillaume Légaré, head of South America at the Toronto Stock Exchange and TSX Venture Exchange (TMX Group), illustrated the uptick in junior activity globally when revealing the annual results of the two exchanges. The number of financings on the TSXV and TSX in 2020 increase by 30% in comparison to 2019, equating to C\$2.9 billion equity capital raised for companies that have mining projects in Latam. In Peru, home to the TMX Group's South American HQ, Légaré praised the stability of the country's mining sector and regulatory environment.

The improved sentiment for juniors was affirmed by Jorge Granda, general manager of AK Drilling, who related that his company's client portfolio in February 2021 was made up of 60% juniors and 40% producers, compared to a 70/30 producers/juniors split in February 2020.

Ivan Bebek, co-chair of Tier One Silver and president and CEO of Sombrero Resources, two new Peru-focused juniors spun out of Auryn Resources, has been working in Peru for over a decade. "A year or two ago, I would have complained about the length of time it takes to obtain permits," he said, before observing the shift that has taken place since Covid, with actions backing up the rhetoric of authorities who have vowed to streamline permitting.

"One of the most important adjustments the ministry made was allowing companies to trench without needing a drill permit to support early-stage exploration," continued Bebek, revealing that Tier One Silver obtained the FTA permit for its flagship Curibaya project in a period of five months, on December 28th, while the country was undergoing an impeachment process and dealing with Covid.

### Cumbersome bureaucracy must be addressed

Although the good will of some of the Peruvian authorities, such as Jaime Gálvez, to speed up the permitting process has not gone unnoticed in recent years, it is hard to achieve meaningful progress in a context of constant political change. Regardless of the intentions of Peru's mining ministers, there has been little time to implement policy in a country where the presidency has changed hands five times in less than three years. Peru needs a sustained period of stability to attract investment dollars that have migrated to jurisdictions perceived as safer, such as Canada and Australia.

Paul Murphy, manager of Mining Plus's South American office, commented that he had spoken to a number of people working in the junior space who have mentioned the challenges and uncertainty with regard to the timing of permits and lack of continuity of the leadership within the MINEM. "These people spend a lot of time developing relationships and trust with local communities, and when there are fre-

quent changes in government and ministerial positions, it can be a serious challenge to contend with," he said.

An illustration of how there is still plenty of room for improvement came from Enrique Garay, president of the IIMP's ProExplo 2021 event and SVP of geology for Rio2 Limited (TSXV: RIO). "The prior consultation process that has been put into place means that permits for a declaration of environmental impact take between 18-24 months and local communities end up being consulted twice. In comparison, the permits in Chile take three months and in Canada only two weeks."

Miles Thompson, president and CEO of Lara Exploration (TSXV: LRA), which holds the Lara copper porphyry JV with Minsur and the Corina gold-silver JV with Hochschild, observed that Peru has a good mining code and a straightforward process to register a claim, but to get anything done in the field is much harder. Comparing the Peruvian situation to other jurisdictions where Lara also has projects, Thompson gave the example of how in Brazil agreements can be made directly with private landowners, whereas in Peru there is a need to deal with various local communities and authorities that don't interact and are slow to make decisions, and everything must go through Lima.

Thompson summarized the challenges the Peruvian mining sector is faced with: "The problem for Peru now is that the reforms necessary to improve its mining climate will be hard to implement due to a distrust in the political class in the country, a divided congress and local communities who have often not seen the benefits of the taxes and royalties paid by mining companies."

Speaking shortly before the second round of the general election, Steve Zuker, president and CEO of Pucara Gold (TSXV: TORO), revealed that Pucara has had discussions with and received many calls from investors concerned about the current situation. "It is hard to get people's attention when there are already so many options for investors and when you then have headline risks, the cost of capital increases significantly," he reflected, adding that only those with a greater risk appetite seem to be interested.

Now, as Pedro Castillo prepares to assemble his new government, how could the new regime impact the junior sector in Peru? On one hand, early-stage exploration does not create an iota of the environmental impact of a mining operation, so those with permits in hand should be able to add value through the drill bit. Furthermore, the price action in juniors with Peruvian projects since the first round of the election in April meant that they were already trading at a discount by the time Castillo was confirmed as president. From an investment standpoint, undervalued assets during a metals upcycle are attractive and hard to find.

However, one should not be dismissive of the threat that a candidate who rose to power on the back of anti-mining rhetoric poses. For the investment community to embrace a country that had lost competitiveness even under moderate governments, the political turbulence that has characterized the country must now settle. Exploration is the lifeblood of mining, and Peru is a mining country. The hope is that this will not be lost on the incoming authorities. ■

# Guillaume Légaré



Head – South America  
TORONTO STOCK EXCHANGE AND TSX  
VENTURE EXCHANGE

### Can you provide an overview of the performance of TSX and TSXV in Latin America's mining industry in 2020?

Toronto Stock Exchange (TSX) and TSX Venture Exchange (TSXV) had great momentum in the mining sector in 2020. Latin America is a very important mining market for us, and currently represents 36% of all mining issuers on TSX and TSXV. As of December 31st, 2020, there were 410 companies mining in Latam listed on TSX and TSXV, with 1,061 mining properties. In 2020, C\$2.9 billion of equity capital was raised with companies that have mining projects in Latam.

### What are the main themes you see impacting Peru's and Latam's mining sector in 2021?

In Peru, specifically, mining is the engine of its economic growth. The country has made great efforts to welcome foreign investments through an open and stable mining regulatory environment, strong fundamentals and stable macro-economic indicators. Issuers and investors are well aware of this positive investment landscape in Peru, where investments will be a critical part of Peru's success in the future. There are currently 62 TSX and TSXV-listed mining companies operating in Peru, with 137 mining properties, and we play an active role developing the country's mineral wealth. Beyond 2021, investors can rely on two essential factors for the mining sector in Latin America: qualified human capital and close attention to ESG factors.

### Can you elaborate on the opportunities for Latam mining companies to move into a low carbon future?

Peru, with its impressive mineral potential, has the possibility of playing a key role in the low carbon future. For this, it is imperative that we see more management teams from Peru and Latin America positioning their companies for future growth. TSX and TSXV have the markets that are necessary to raise the capital to finance this growth. ■

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## Ivan Bebek

Co-Founder, President & CEO  
SOMBRERO RESOURCES

Sombrero Resources is in the process of applying for a listing on the TSX exchange and is working toward meeting final conditions prior to an anticipated listing in the second half of 2021.

### Can you elaborate on the circumstances surrounding the creation of Sombrero Resources?

Sombrero Resources was spun out of Auryn Resources in October 2020 and holds the Sombrero copper-gold project in southern Peru. We had raised and spent over C\$100 million in Auryn looking for world-class precious and base metal discoveries and we identified several significant projects in both Canada and Peru, including Sombrero, which at the time was considered the flagship of Auryn. To allow each project to get the attention and valuation it deserves, we then split Auryn into three, by commodity focus; Fury Gold Mines, Tier One Silver and Sombrero Resources. We believe Sombrero Resources is a world-class copper/gold opportunity and anticipate listing in the second half of 2021.

### What is the history of the Sombrero project, and what attracted you to it?

Many major mining companies have reviewed the Sombrero project as it sits on the western half of the Andahuaylas-Yauri belt, where world famous mines such as Las Bambas, Tintaya, Antacapay and many others are present; however, it was missed. Sombrero was primarily overlooked because of a thin blanket of volcanic rocks that sits on the surface. This layer of rock was identified in a government survey as Miocene age, which is not the prospective Eocene aged mineralization that hosts all the world-class mines about 200 km to the west of Sombrero. However, a geologist, Miguel Cardozo saw the potential through small erosional windows of outcrop that had limited rock sampling and returned high-grade copper and gold. He introduced us to the project and we were able to confirm that the age of the mineralization below the volcanic cover is in fact Eocene and we strongly believe the Andahuaylas-Yauri belt extends over 200 km west to where the Sombrero project is located. We have now taken over 5,000 samples, completed geophysics and some channel sampling, which returned up to 184 m of 0.57% CuEq. We also acquired some historical drilling data completed by an international steel company that was pursuing the claims for iron at the time, and their holes returned 0.58% copper equivalent over 116 m near surface.

### What exploration plans do you have at the Ccascabamba and Nioc targets in 2021?

We have received a DIA permit on our Ccascabamba target, which allows us to drill from an environmental perspective, and we are now working toward our social permits. Once fully permitted, our first drill program will include up to 38 drill pads to start testing the 12 km strike length of targets that we've identified through surface work and geophysics. We are looking to obtain access and permits so that we can do the same at the Nioc target this year.

### Which communities are in the vicinity of the north-western extension of the Andahuaylas-Yauri belt, and to what extent are mining and exploration accepted in the region?

The two communities of significance are Huancasancos and Lucanamarca, with whom we have spent considerable time getting to know and supporting through extensive community efforts, including federally recognized Agroideas programs that we have introduced and sponsored. Although it has taken time, we are very pleased with the rapport we have been able to establish prior to and during COVID. We have taken the longer route to establish deep ties with the community so we can be more aligned with stakeholders on a long-term, sustainable basis.

### What is the financial position of the company, and when do you intend to list publicly?

As of today, the company has over US\$6 million in its treasury and does not require funds. However, we will look to finance prior to listing to fund future drill programs. The company is in the process of applying for a listing on the TSX exchange and is working toward meeting final conditions prior to an anticipated listing in the second half of 2021. ■



## David Kelley

President & CEO  
CHAKANA COPPER

The goal is to publish a maiden resource for Soledad in Q3 2021. Once the resource is out, we will decide whether we do a PEA or stay aggressive with drilling to expand the resource.

### Can you tell us about the milestones achieved by Chakana Copper in 2020, including the three new discoveries made at Soledad since drilling recommenced in August?

During the Covid lockdown in Peru, we were able to get the permit approved to drill in the central part of the project area, where we had previously only done surface work. This was a critical milestone, as we were well funded from the Gold Fields transaction and started drilling some very attractive targets. We started at Paloma East, a fairly small outcropping breccia pipe which gets considerably bigger at depth. We then moved 150 m to the west and tested another breccia pipe, Paloma West, with a slightly bigger footprint at surface and very high grades. Finally, we moved over to the Huancarama Breccia Complex, which is one of the targets we were most excited about.

### What has been your approach to drilling the new targets at Soledad?

We have always had the belief that these breccias are like fingers on a hand, which as you go deeper coalesce into one larger Breccia body. Our scout drilling is ongoing, but we have already confirmed that on the eastern half of the Huancarama Breccia Complex, two of the breccias do coalesce at depth, forming a larger breccia body with dimensions of about 100 m by 60 m in a horizontal extent. This target at Huancarama has mineralization open at depth, which we have drilled from surface down to about 225 m.

### What have exploration results so far told you about the type of mine Soledad could become?

The vision for Soledad has always been a number of high-grade mineralized breccia pipes, vertically extensive and very close together, containing copper, gold and silver, with the ability to mine several of these pipes at the same time. The fact that these breccia pipes sit in a hillside with about 500 m of relief is a perfect setting to be able to get into the mineralized areas by simple development of horizontal tunnels to access working faces.

The scale of the mineralization we are seeing at the Paloma area, and the proximity of the breccia pipes, as well as Huancarama's footprint, means that we can start considering the potential for small-scale open-pit mining. This would lend itself to a staged capex approach before moving underground. This creates additional optionality, which is what mining engineers have always loved about this project. You can put different breccia pipes into production, or multiple zones within a pipe into production.

### In January 2021, Chakana announced a C\$10 million private placement with Gold Fields increasing its ownership interest. Can you elaborate on this transaction?

When we announced the financing, we still had C\$3.3 million in the treasury, which was enough to fund our current drilling campaign and get to a first resource. However, we recognized that these new discoveries will require substantial infill drilling, and we want to stay aggressive on the exploration side. Gold Fields has been a great partner from the beginning. They were keen to see us ramp up and accelerate the program, and were keen on increasing their equity position from 16.8% to 19.99%. We see this as validation for the project, the team that we have, and the work that we are doing.

### Which areas are you targeting for the 2021 exploration campaign, and when can we expect a maiden resource?

For 2021, we have 26,000 m of drilling planned, consisting of 16,000 m of resource/infill at the new discoveries, with an additional 10,000 m of new target testing. The goal is to publish a maiden resource for Soledad in Q3 2021.

Once the resource is out, we will decide whether we do a PEA or stay aggressive with drilling to expand the resource. We will also be doing metallurgical and engineering studies, as well as expanding our permit to access more targets and explore underground. ■

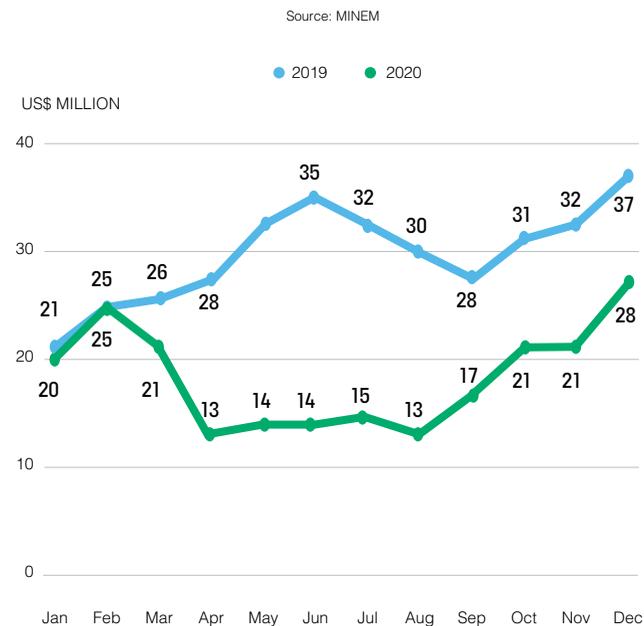
# Copper Exploration

## THE JUNIORS LOOKING TO REPLENISH PERU'S COPPER PIPELINE

A lack of major development projects on the horizon after Quellaveco comes into production in 2022 has sharpened the spotlight on copper-focused juniors. If Peru is serious about making inroads into Chile's lead as the world's number one copper producer, the country will require more than just brownfield expansions, but significant greenfield discoveries moving rapidly through the exploration and development lifecycle.

Chakana Copper (TSXV: PERU) is currently advancing its Soledad project near Aija, in the Ancash region of the Miocene mineral belt, and achieved a critical milestone during the Covid lockdown in 2020 when it was awarded a permit to drill in the central part of the project area. When drilling re-

Exploration Investment In Peru (by Month)



commenced in August, the company was able to make three new discoveries; at Paloma East, a small outcropping breccia pipe which gets bigger at depth; Paloma West, a high-grade breccia with a bigger footprint at surface; and Huancarama, a larger breccia complex with five principal pipes cropping out at surface.

David Kelley, Chakana's president and CEO, explained that these breccias are like fingers on a hand, which, as you go deeper, coalesce into one larger Breccia body, and the ongoing scout drilling performed has confirmed that two of the breccias do coalesce at depth on the eastern half of the complex.

Elaborating on the type of mine he envisages at Soledad, Kelley commented that the scale of the mineralization at the Paloma area and the proximity of the breccia pipes, as well as Huancarama's footprint, means that Chakana can start considering the potential for small-scale open-pit mining, which would lend itself to a staged capex approach before moving underground. He added: "This creates additional optionality, which is what mining engineers have always loved about this project. You can put different breccia pipes into production, or multiple zones within a pipe into production."

In January 2021, Chakana announced a C\$10 million private placement with Gold Fields increasing its ownership interest to 19.99%. In February, the South African gold producer transacted with another copper-focused junior, Regulus Resources (TSXV: REG), with Regulus signing an option agreement to further consolidate the land position around its AntaKori copper-gold project.

In a statement, CEO John Black pointed out that these claims allow Regulus to layback its current resource estimation pit further than it could previously, which should add resources that are already classified but not within the current constraints of the estimated resource pit.

## TSX Venture Exchange Statistics

Source: TMX Group

### Number of Mining Financings in Peru (TSXV)

2019	2020	INCREASE
24	48	100%

### Capital Raised (C\$ million)

2019	2020	INCREASE
48	159	329%

The new kid on the block in Peru's copper community is Element 29 Resources (TSXV: ECU), but the company brings with it a wealth of experience, including president and CEO Brian Booth, previous CEO of Pembroke Copper Corp. E29 was spun out of project generator GlobeTrotter Resources, taking two new assets to the market, the Elisa and Flor de Cobre projects, and putting them into a new shell before competing its IPO in December 2020.

Flor de Cobre is a copper porphyry located near Arequipa, close to Chapi and Cerro Verde, which until recently had been privately owned. The historic Candelaria resource on the project was drilled in the 1990s by Phelps Dodge, but not developed at the time because it needed to be 1% or better to be feasible as a leach project, according to Booth, who noted: "In today's world, a 57 million ton resource at 0.67% copper, all above 200 meters (m) from surface, is very attractive."

E29's other project, Elida, a large property of just under 20,000 hectares located 170 km northwest of Lima, was drilled by Lundin Mining in 2015. Booth commented on what attracted his team to the project: "When you initially drill porphyries and want to see their significance, you need to see scale. Lundin drilled numerous holes that are 500 m to 600 m intersections at good grade copper molybdenum silver, which shows that there is potential for significant volume."

Having raised C\$6.7 million to further exploration and development in 2021, Booth outlined the company's plans for the year, which include releasing a maiden resource at Elida, a new 43-101 report to modernize the historic resource at Flor de Cobre, and resource extension work around both. This will be followed by metallurgical work from the core at Flor de Cobre that will go towards a PEA.

The macro theme of a future fueled by copper is also making new management teams revisit old projects, as is the case for Camino Corp. (TSXV: COR), whose president and CEO, Jay

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**Contact:** Brian Booth, President, CEO & Director  
1-888-246-7881, [info@e29copper.com](mailto:info@e29copper.com)  
[www.e29copper.com](http://www.e29copper.com)



## Brian Booth

President & CEO  
ELEMENT 29 RESOURCES

### Can you explain the circumstances leading to Element 29 Resources' (E29) IPO in December 2020?

E29 has taken two new copper assets to the market. Generally speaking, in our peer group most companies have one key copper asset. After the acquisition of the Elida and Flor de Cobre projects in early 2020, the company completed an IPO in December, raising C\$6.7 million to further exploration and development in 2021.

### What is the history of the Flor de Cobre property and the Candelaria discovery?

Flor de Cobre is a copper porphyry located in the Southern Peru, near Arequipa, very close to the Chapi and Cerro Verde mines. Until recently it was privately owned by a family who did not have the means to develop the asset and were happy to sell at the right time. Candelaria has an historic resource on the project which was drilled in the 1990's by Phelps Dodge. It was not developed at the time because copper grades needed to be 1% or better to be feasible as a leach project as the copper price was US\$1/lb at that time. In today's world, a 57 million tonne resource at 0.67% copper, all above 200 meters (m) from surface, is very attractive. In 2021, we will be modernizing this historical resource through a drilling campaign in and around the existing holes. We expect to get our drill permits in Q3 2021 with drills turning shortly thereafter.

We have another target on the project called Atravezado, which has a similar surface expression as Candelaria, but has yet to be drilled. This has the potential to add additional material for an SX-EW type plant.

### Can you tell us about the Elida property and the potential you see in this asset?

Elida is a large property of just under 20,000 hectares, located 170 km northwest of Lima, that was drilled by Lundin Mining in 2014-15. There are five individual porphyry targets on Elida, which has 18 holes drilled on one of these five targets. Lundin drilled numerous holes with 500 to 600 m long intersections returning good copper, molybdenum and silver grades. The copper equivalent (CuEq) grade is above 0.5%, which is attractive at today's metal prices. We recently received our drill permits and are currently executing the 4,000 meter diamond drill program. We expect to have drill results in Q3 2021 with the goal of publishing a maiden resource estimate early in 2022.

### A number of projects in Peru have been stalled due to community conflicts. Where does E29 sit in this regard?

E29's projects are close to the coast and there are no communities living on either project. The Aco community is located near Elida, and we have a very good relationship with them, which was started with Lundin. We renewed our community agreement with them for five more years during the COVID lockdown and intend to show the community that they will be involved in the project as a main stakeholder.

At Flor de Cobre, the Candelaria property is largely owned by the government and a local company. The Atravezado target involves a community which we already have an agreement with to do the surface work and they have helped us with geophysical labor and camp work.

### Where will you be investing the money you have raised in 2021?

With this money we can get to a maiden mineral resource at Elida, and a new 43-101 to modernize the historic resource at Flor de Cobre, as well as doing some resource extension work around both projects. Then we can start some metallurgical work from the core at Flor de Cobre, which will give us information towards a PEA to get leach recoveries from the project. E29 is currently undervalued compared to its peer group with a lot of catalysts for growth in 2021. ■

With the money we raised, we can get to a maiden mineral resource at Elida, and a new 43-101 to modernize the historic resource at Flor de Cobre, as well as doing some resource extension work around both projects.

## Jay Chmelauskas

President & CEO  
CAMINO CORPORATION



At Los Chapitos, we are in a unique position to drill towards a maiden resource, since previous drilling campaigns have realized very good intercepts of copper such as DCH-034 with 95 m of 0.85% Cu.

### Can you elaborate on the recent investment agreement between Camino Corp and Denham Capital to acquire the Maria Cecilia Porphyry Complex in Peru?

We saw an opportunity with Denham Capital, a US\$10 billion resource-focused investment fund, to acquire a porphyry district in Peru. It is an asset that Denham had invested US\$28 million into and were looking for a group to take the project forward through the next stage of exploration. We bought the project outright and own 100%, with Denham becoming our largest shareholder. Denham has the capability to fund larger transactions and is interested in both building and acquiring, so we intend to collaborate on future projects. In return, Denham is investing in a management team that has a track record of successfully building companies that have a large institutional following.

### Which of Camino's three assets would you consider its flagship project?

Los Chapitos is currently our flagship property. At Los Chapitos, we have already conducted over 20,000 meters of drilling in a very specific area over the past four years, and our target for this year is to continue drilling along a strike of the 8 km Diva structure that controls copper mineralization. We are in a unique position to drill towards a maiden resource since previous drilling campaigns have realized very good intercepts of copper such as DCH-034 with 95 m of 0.85% Cu. We are targeting more near surface oxidized copper for an envisioned low capital SXEW copper operation. However, we will also test for primary sulphide mineralization over our 220 km<sup>2</sup> land package.

We planned our drilling campaigns towards more discovery drilling. For instance, Maria Cecilia is an acquisition that comes in a porphyry district with several porphyry centers. Two porphyrys have been drilled with over 30,000 metres of drilling complete. Our interest is to drill the third porphyry center – Maria Cecilia, which we consider to be the heart of the porphyry district. We will be conducting 100% of the discovery drilling at this third porphyry, Maria Cecilia, in 2021.

Plata Dorada is our third asset, but it is still early stage and does not fall into the same category as Los Chapitos and Maria Cecilia, however, we have recently expanded our land position at Plata Dorada after seeing exceptional results in our surface sampling program. Exploration success would lead to an envisioned mid-size high-grade operation at Plata Dorada.

### What did exploration results from Camino's fall 2020 drilling campaign at Los Chapitos reveal about the project, and what are the company's drilling plans for 2021?

Our 2020 drill campaign at Los Chapitos continued to make significant intercepts of near-surface copper oxidized mineralization at the Adriana zone (64.5 m of 0.6% Cu including 12 m of 1.05% Cu) to add to potential new tonnage for a maiden resource. Secondly, we have identified areas of significant alteration and copper mineralization at zones like Lourdes that extend over 1 km<sup>2</sup> along our main mineralized Diva fault structure. This alteration suggests a large amount of geological fluid flow that could potentially host a large deposit for discovery.

We are permitted to drill the southern extension, extending approximately 4 km to the south of the Adriana zone. We are also advancing permits to drill the same geology and Diva structure towards the north and expect the permits to be achieved by July 2021. Maria Cecilia is also expected to be permitted in mid-2021. We are fully funded for our exploration and drilling strategy for 2021 that will start with 6,000 metres of drilling.

### Where will Camino focus its efforts for the rest of 2021, and what would you like to achieve by 2022?

In May 2021 we closed an oversubscribed private placement for US\$7.5 million, which will be used to support our exploration activities. We have been fortunate to be able to continue advancing our projects throughout the pandemic and acquire a new property, and we are on target to start new drilling campaigns in July 2021. ■

Chmelauskas, was drawn to the company's Los Chapitos project because of previous drill results from 2017 that indicated the potential scale and grade for a copper mine. Speaking of the company's flagship Los Chapitos project, Chmelauskas noted that over 20,000 meters of drilling has already been conducted in a very specific area over the past four years, and Camino's target for 2021 is to continue drilling along the 8 km extension of the Diva structure. "Subject to permitting, we will drill on other targets throughout our 220 km<sup>2</sup> land package," he added. On March 30th, 2021, Camino announced the company had entered into an agreement with Denham Capital to acquire the Maria Cecilia porphyry complex in Peru, adding a third project to its portfolio. Chmelauskas pointed out that Denham, a US\$10 billion resource-focused investment fund, "has the capability to fund larger transactions and is interested in both building and acquiring, so we intend to collaborate on future projects."

**New copper juniors to list in 2021**

Ivan Bebek has been a busy man. Aurn Resources spun out three companies in 2020, resulting in the Quebec-focused Fury Gold Mines (TSX: FURY) listing in Q4 2020, Tier One Silver (TSXV: TSLV) listing in June 2021, and finally Sombrero Resources, which intends to list in the second half of 2021. Sombrero will focus on copper and gold, with Bebek as its president and CEO, who clarified that the idea behind the spin offs was to give each project the attention and valuation it deserves, separating them by commodity focus. Considering the Sombrero project sits on the western half of the Andahuaylas-Yauri belt on the same trend as Las Bambas, Tintaya and Antapaccay, why has it remained undeveloped? "Sombrero was primarily overlooked because of a thin blanket of volcanic rocks that sits on the surface," said Bebek, explaining that this layer of rock was identified in a government survey as Miocene

age, which is not the prospective Eocene aged mineralization that hosts the mines to the west of Sombrero. "However, geologist Miguel Cardozo saw the potential through small erosional windows of outcrop that had limited rock sampling and returned high-grade copper and gold." After confirming that the age of the mineralization below the volcanic cover is in fact Eocene, the Sombrero team believes the Andahuaylas-Yauri belt extends over 200km west to where the project is located. "We have now taken over 5,000 samples, completed geophysics and some channel sampling, which returned up to 184 m of 0.57% CuEq," detailed Bebek, adding that historical drilling data completed by an international steel company that was pursuing the claims for iron returned 0.58% CuEq over 116 m near surface.

Forte Minerals Corp (formerly Forte Copper Corp) was formed in 2016, but decided to stay private while amalgamating assets. Patrick Elliott, Forte's president and CEO, explained that this was to help preserve share capital and assemble a meaningful portfolio before going public and drill testing. Now the company intends to list on the CSE in July 2021, by way of IPO with Haywood Securities Inc., and plans to raise up to C\$4 million to support exploration expenditures planned for 2021-22 on its porphyry copper and epithermal gold projects in Peru, revealed Elliott. Like Element 29 Resources, Forte Minerals' Esperanza and Pucarini assets are the fruits of a decade of generative work with GlobeTrotters Resource Group in Peru, where Elliott worked with Richard Osmond and Manuel Montoya, formerly of Teck Resources. Forte's third property, Don Gregorio, is a JV with Candente Copper, and Elliott hopes to have received permits for at least two of his projects by Q4. Describing the potential he sees in the assets, Elliott said: "Significant value growth is generated when early stage exploration moves towards resource definition, while zoning in on target development and eliminating the early-stage grassroots risk. All three of Forte's properties offer this opportunity." He also pointed out that the alteration systems at Forte's projects are large enough to be meaningful to move into a development phase if exploration success is achieved. ■



**Patrick Elliott**

President & CEO  
**FORTE MINERALS CORP**

**Why has Forte Minerals Corp decided to rebrand from Forte Copper Corp and go public in 2021?**

Forte Copper Corp was formed in 2016, but Forte wanted to stay private while amalgamating assets. This helped to preserve share capital and assemble a meaningful portfolio before going public and drill testing. With the copper market performing the way it has in 2021, and the positive fundamentals moving forward, Forte feels it is a good time to go public. Forte initially focused on copper porphyries, but as things evolved in Peru, Forte was able to acquire some prospective ground in a gold district in Puno that had been relatively underexplored. Today, about 75% of the 23,000 hectares Forte owns are epithermal, high-sulfidation gold prospects. Therefore, we decided to rename the company Forte Minerals Corp, to better reflect the assets and our focus.

**How did the GlobeTrotters Resource Group exploration model lead you to the Esperanza and Pucarini properties?**

The GlobeTrotters exploration model involves collecting government data, generating algorithms to identify geophysical aster anomalies, and populating thousands of anomalies throughout the Andes. It works best in areas without vegetation cover, helping to delineate argillic and sericitic alteration zones. Of the anomalies identified, Esperanza and Pucarini were two of the properties that attracted us the most. Through government auctions, GlobeTrotters acquired Esperanza in 2014 and Pucarini in 2018, and spun them out into Forte. Esperanza is a porphyry copper moly system located northwest of Zafraanal, and is drill ready. Pucarini was previously a Teck property from 2011 to 2015, and therefore well-known to Manuel Montoya. It is a huge land package, where Forte has staked 12 targets over 16,000 hectares. Forte completed a geochemical, geophysical and geological mapping work program at Pucarini in November 2020, and will drill test the principal target in 2021 alongside a regional surface exploration program on the other anomalies to better define the targets.

**Forte also owns the Don Gregorio property. Can you tell us about this asset,**

**and which of Forte's three projects you would consider as its flagship?**

In 2017, Forte Minerals entered into an option agreement with Candente Copper to purchase 60% of the Don Gregorio project, with Forte as operators of the JV advancing the permitting, exploration drilling, social initiatives and resource development. Don Gregorio could potentially be the flagship property, but it is not the one which is going to get drilled first due to a longer permitting timeline. However, it is more advanced than Esperanza and Pucarini, as gold and copper mineralization has been encountered on the subsurface enabling Forte to focus on expanding and defining a resource.

**What is Forte Minerals' timeline for listing publicly?**

Forte Minerals plans to list sometime in July 2021, on the CSE by way of IPO. Forte plans to raise up to C\$4 million to support exploration expenditures planned for 2021-22 on its Porphyry Copper and Epithermal Gold projects in Peru. This will generate sufficient working capital to undertake two drilling programs in 2021. Considering the time it takes to attain permits in Peru, Forte Minerals' approach is to work on permitting all three of the projects at the same time from the get go. Forte has initiated the permitting process on all three projects and expect to receive 2/3 by Q4 2021.

**Do you have a final message about what makes Forte Minerals an attractive proposition?**

Moving rapidly along the line of opportunity towards a value maxima is very attractive to investors. Significant value growth is generated when early stage exploration moves towards resource definition, while zoning in on target development and eliminating the early-stage grassroots risk. All three of Forte's properties offer this opportunity, with tremendous upside considering their geological potential. Furthermore, these alteration systems are large enough to be meaningful to move into a development phase if exploration success is achieved. Most importantly, Forte will not undergo heavy dilution off the bat, and will only raise what is suitable to take the company to the next stage of the valuation curve. ■

Considering the time it takes to attain permits in Peru, Forte Minerals' approach is to work on permitting all three of the projects at the same time.

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# Precious Metals Exploration

## MANIPULATION, INFLATION AND OPPORTUNITY

On January 28th, 2021, a Reddit subgroup called WallStreetBets sent out a call to buy silver after the Robinhood trading platform announced it would limit purchases of a number of stocks including GameStop (GME). This 'short squeeze', that caused retail investors to pile in en masse and drove up silver by almost 20% in just three trading days, was different to the GME phenomenon for two reasons.

First, silver has solid fundamentals, whether as a safe-haven monetary asset that follows the price of gold, or as an industrial metal used in the production of solar panels and cell phones. Secondly, and more ominously for silver bugs, a short squeeze on silver pits retail up against the likes of JP Morgan, rather than Melvin Capital.

Despite manipulation of the precious metals markets, illustrated by the US\$920 fine handed to JP Morgan in September 2020 for the illegal practice known as spoofing, the outlook for silver remains bullish. A steady price appreciation in response to the impending government stimulus packages and increasing demand for physical silver would surely serve the industry better than any boom and bust mania inspired by Reddit and Twitter.

A new junior poised to take advantage of silver's momentum is Tier One Silver (TSLV), which was spun out of Auryr Resources in October 2020, and went public on June 9th, 2021 (TSXV: TSLV). The company's flagship asset, Curibaya,

is an 11,000-hectare property that sits in a copper porphyry belt hosting some of Peru's largest deposits, including Cerro Verde, Toquepala and Quellaveco. TSLV's second project, Emilia, sits next to Tía María and could be described as an analogue to Cerro Verde – a massive porphyry system outcropping along the coast of Peru that has seen limited exploration work, according to co-founder and co-chair, Ivan Bebek.

Elaborating on the mineralization at Curibaya, Bebek described it as a fully preserved precious metal target on top of a large porphyry intrusion, with early exploration results including 80 samples on surface that run over 500 grams silver up to 298 kilo silver, over a 20 km<sup>2</sup> alteration system, as well as about 60 samples that run over 2 g/t gold up to 934 g/t gold.

Expanding on the potential he sees, Bebek stated: "This is one of the largest exploration opportunities for a precious metal system that I have seen in my 21 years in this business in terms of abundance of high grade, scale identified through geophysics and proximity to world-class deposits on a major mining trend."

Latitude Silver was a private company founded four years ago, which eventually found a home in the Recuperada district of Huancavelica, and renamed it Nueva Recuperada. On February 11th, 2021, Metals Trading (Peru) PLC (commercially known as Latitude Silver) and Oro X announced a business combina-



*The Gaban project is the closest upstream gold project to the giant Madre de Dios goldfield in the Amazonian alluvial plain, and we believe that at least some of the gold at Madre de Dios came from here.*



**- Mark Sander,  
President,  
Winshear Gold**



tion agreement, resulting in the creation of Silver X. The team, led by CEO José M. García, executive chairman Luis Zapata, and lead advisor Paul Matysek, intends to ramp up production and grow the resource at its Recuperada mine, as well as developing the Coriorco and Las Antas projects owned by Oro X. "The idea with Silver X is to grow through exploration, development and production, but also through M&A activity, because we want to create a mid-tier silver producer in Latin America," stated Garcia.

Garcia detailed that the Recuperada mine, which is a former Buenaventura operation, comes with a processing plant, infrastructure and all the social licenses to operate. Summarizing the company's near-term plans for the asset, he added: "In other words, it can be moved back into production quickly and cheaply. We see great potential for expanding the resource and scaling production at the mine, and to do this we have an aggressive drilling program of 30,000 meters planned in 2021."

### Gold-focused juniors

Peru has lacked a leading gold-focused junior in recent years, which is regrettable now, as the dwindling reserves of producers in the country has coincided with robust metal prices. This does, however, offer excellent opportunity for a well-funded junior in a land of rich

geology. Thus the positive market reaction to Pucara Gold's hotly anticipated IPO (TSXV: TORO) in October 2020, saw the company trading at C\$0.83 out of the gate. However, as is the risk with greenfield exploration, underwhelming drill results from its maiden campaign at its Lourdes project in January sent the share price crashing. Reflecting on the results, Steve Zuker, president and CEO, said: "We always knew there were multiple systems and in touching the edge of one of the systems we got three promising intercepts, but the market expected better. I believe that we will get the results that we are looking for in the future."

Despite the disappointment, Pucara has two flagship assets and, in 2021, the company will be concentrating the bulk of its activities on field and permitting work at the Pacaska gold-copper project. The team is in Peru, working to obtain the necessary permits at Pacaska to carry out a drill campaign before the start of the next rainy season, and Pu-

cara has also partnered with a number of high-profile companies to develop other assets in its portfolio. "Over the course of the next 12-18 months, six of our eight projects will be working towards making a world class discovery," stated Zuker, referencing the interest of Solaris Resources (TSX: SLS) in Pucara's Capricho (porphyry copper) and Paco Orco (carbonate replacement deposit) assets, and IAMGOLD's (TSX: IMG) ongoing drilling at Los Tambos. "If all three optioned projects are carried to fruition, our partners will invest C\$43 million into the ground and make payments to Pucara of roughly C\$3.5 million," he added.

Another player in Peru's junior gold segment is Winshear Gold (TSXV: WINS), a company that arose from a predecessor company called Helio Resource Corp. that had worked in Tanzania for approximately 15 years. Winshear pivoted and decided to purchase two Peruvian assets from Palamina Corp: the Gaban gold project and the Tinka iron oxide

copper-gold (I.O.C.G) project. Mark Sander, Winshear's president, elaborated on what drew him to Gaban: "The Gaban project is the closest upstream gold project to the giant Madre de Dios goldfield in the Amazonian alluvial plain, and we believe that at least some of the gold at Madre de Dios came from here."

Further upstream there are multiple gold projects of significance, including Minera IRL's Ollachea gold project, which currently has approximately 1 million oz of reserves at feasibility stage, as well as the Crucero deposit with approximately 2 million indicated oz of gold. Comparing the potential of Gaban to the more advanced assets in the region, Sander said: "Ollachea is still awkwardly held and not amendable to acquisition or merger, but the Gaban project is very close and very similar geologically. I have the expectation that the Gaban project will grow to at least a similar size deposit as the Ollachea deposit." ■



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## Ivan Bebek

Co-Founder & Co-Chair  
TIER ONE SILVER

The Curibaya project has been getting a lot of attention due to the incredible high-grade silver that's been sampled on surface and the large-scale geophysical targets situated directly below that high-grade.

### Can you introduce Tier One Silver (TSLV) and provide an overview of the company's portfolio?

Tier One Silver (TSLV) is a new exploration company that just started trading on the TSXV. It was spun out of Aurnyn Resources in October 2020. We raised and spent over C\$100 million in Aurnyn looking for world-class precious and base metal discoveries. We succeeded in identifying significant projects in both Canada and Peru, including three flagship opportunities, and now Tier One Silver has one of them — the Curibaya project. This project has been getting a lot of attention due to the incredible high-grade silver that's been sampled on surface and the large-scale geophysical targets situated directly below that high-grade. We have also identified two additional high potential projects – Hurricane Silver and Emilia. Hurricane Silver is an underexplored region of Peru with exceptional silver grades and outcropping veins identified in early sampling work. Emilia, which sits next to Tía María, could be described as an analogue to Cerro Verde – a massive porphyry system outcropping along the coast of Peru that has seen limited exploration work.

### What type of mineralization do you have at Tier One's flagship Curibaya property?

Curibaya is an 11,000-hectare property located in a copper porphyry belt that hosts some of Peru's largest deposits, including Cerro Verde, Toquepala and Quellaveco. It is a fully preserved precious metal target, the first major epithermal occurrence on this belt, on top of a what may potentially be a large porphyry intrusion, which we've identified through magnetics. Of consequence, the highlights include 80 samples on surface that run over 500 gram silver up to 298 kilo silver over a 20 km<sup>2</sup> alteration system, as well as about 60 samples that run over 2 g/t gold up to 934 g/t gold.

We recently completed geophysics, and identified 750 m of veins and breccia structures, as well as a massive mineralized target that's about 400 m in diameter. This could potentially be the nucleus that these metals emanate from, situated above a porphyry target that would start about 500 m from surface. This is one of the largest exploration opportunities for a precious metal system that I have seen in my 21 years in this business in terms of abundance of high grade, scale identified through geophysics and proximity to world-class deposits on a major mining trend.

### On February 11th, TSLV announced it would undertake a non-brokered private placement for gross proceeds of up to C\$10 million. Where will this money be directed?

The capital will take us to the end of the year, allowing Tier One Silver to fund the approximately 10,000 m of drilling at Curibaya, where we will target the precious metal system as well as the potential porphyry targets below. It will also cover initial targeting work at our newly acquired Hurricane and Emilia projects to bring them to a drill-ready stage as well.

### Have you noticed an improvement in the climate for juniors in Peru recently?

A year or two ago, I would have complained about the length of time it takes to obtain permits, however, there has certainly been a shift since Covid. I believe Peru understands the importance of expediting project development so Peruvians can benefit from the wealth created by large-scale mining operations. One of the most important adjustments the ministry made was allowing companies to trench without a drill permit, supporting early-stage exploration. For Curibaya, we obtained our FTA permit in a period of about five months, receiving it on December 28th during the impeachment and during Covid limitations.

### What are your feelings regarding the uptick in silver-focused juniors?

Silver is the best performing equity for an exploration company during a bull market. Silver has a history of outperforming all precious metals. I would not want to see silver shoot up too sharply overnight, as this could be short-lived, and we do not need inflated prices to make our project work. ■

## José M. Garcia

CEO  
SILVER X



### Can you explain the circumstances that led to the merger of Oro X and Latitude Silver to create Silver X?

Latitude Silver was founded four years ago with the idea to find opportunities in Peru. Looking at old mining districts, we eventually found a home in the Recuperada district of Huancavelica, and renamed it Nueva Recuperada.

The combination with Oro X provides two opportunities; it has two interesting projects, Coriorcco and Las Antas, but just as importantly, Oro X comes with an outstanding management team. The idea with Silver X is to create a mid-tier silver producer in Latin America.

### What steps need to be taken to put the Recuperada mine back into production?

The Recuperada mine, which is a former operation of Buenaventura, comes with a processing plant, a lot of infrastructure, and all the social licenses to operate. We see great potential for expanding the resource and scaling at pro-

duction at the mine, and to do this we have an aggressive drilling program of 30,000 meters planned in 2021. We will also explore the possibilities of deeper mineralization, to break the paradigm of narrow-vein mining. We believe that the 600 tonnes per day (mt/d) at the plant we have today has the potential to be significantly increased over the coming years.

### What potential do you see for major discoveries in the Nueva Recuperada district?

Geologically speaking, Recuperada is a big epithermal system that has been mined at a modest scale for silver, lead and zinc since colonial times. In the district, where Silver X owns more than 15,000 hectares, we have multiple targets including more than 100 veins that are mineralized. We believe that modern exploration and production techniques will bring the district back to life, making it the next major silver mining district in Peru. ■

## Steve Zuker

President & CEO  
PUCARA GOLD LTD.



### Pucara flew out of the gate after its IPO, but the stock dropped when the initial Lourdes results were released. What do you think went wrong?

The area we had targeted had all the characteristics of gold-bearing mineralization, but we did not hit the gold we expected when the assays came back. We always knew there were multiple systems, and in touching the edge of one of the systems we got three promising intercepts, but the market expected better. I believe that we will get the results that we are looking for in the future.

### What will the field activities at the Pacaska Gold-Copper project in 2021 entail?

Pucara is currently advancing permitting at Pacaska and prepping a workshop presentation with the community. We are hoping to have the EIA (Drill Permit) approved and to commence with drilling by late 2021. Meanwhile, there is some surface work we want to do for the gold and copper areas where we have compelling indicators from data generated in 2019/2020.

### Can you elaborate on the Keyla HSE gold project and the plans you have for this asset?

Keyla is another high sulphidation epithermal (HSE) gold target, where Pucara has a very large land position with a huge alteration footprint. We are currently following up on gold soil surveys completed in 2019 and aim to do additional geological mapping and some channel sampling in the near future. We will be working on both Pacaska and Keyla somewhat simultaneously in 2021.

### Why did Pucara decide to have a dual listing on the TSXV and the Lima Stock Exchange (BVL)?

Although Pucara only listed on the TSXV last year, listing on the BVL made sense to give local stakeholders an opportunity to invest in great gold projects. To illustrate how rare this is, the last time a Peruvian gold player was listed in Peru was 10 years ago with Rio Alto. ■

# Zinc: Reviving An Historic District

## THE CERRO DE PASCO SITUATION

Situated 4,300 m above sea level in the Andes in central Peru, the city of Cerro de Pasco is built around a zinc, lead and silver mine, most recently operated by Volcan. Although mining had brought employment to the city for years, a legacy of mismanaged assets stemming back to when the military government nationalized the mine resulted in high levels of lead pollution contaminating the surrounding environment. Time Magazine listed Cerro de Pasco as one of the ten most polluted places on earth as health issues began to escalate for residents and wildlife.

In 2018, Cerro de Pasco Resources (CSE: CDPR) went public with the purpose of treating and reprocessing all the dumps, tailings, mining waste and material resources in the Cerro de Pasco region, and in November 2019, announced it would acquire Volcan's Oxidos de Pasco asset for US\$30 million. However, after several extensions pushed back the deal, CDPR decided not to extend the agreement at the end of October 2020.

Steven Zadka, CDPR's executive chairman, revealed that the company is now looking at establishing a partnership instead. "There are legacy issues that belong to Volcan and Glencore that must be adequately understood and ring-fenced prior to any agreement," he said, adding: "We continue to believe it would be advantageous to Cerro de Pasco for CDPR to reintegrate and operate the whole mine, as the asset would benefit from a new management team looking at the operation holistically." Expanding on the complexities of the

situation, Zadka suggested that the economic, environmental and health issues need to be addressed together as one package instead of working piece by piece, as has been happening over the past 20 years. "All the water systems are connected, for instance, so the open-pit is hydrologically connected with the stockpile and the tailings."

CDPR brought in Bernhard Dold as CTO in 2020, a leading expert on mine closure and acid mine drainage. "He has studied Cerro de Pasco and over 30 scientific publications on the region, and the consensus is that the health problems will not be fully resolved unless you reprocess waste and move people out of the most affected areas," related Zadka, observing that a lot of people in Cerro de Pasco want to move, but there is currently no economic way for them to do so.

The company is now looking at partnerships that involve the government and external funds such as the multilateral agencies, and has not ruled out the possibility of purchasing further assets in Peru, as they have an operational team ready to work.

Zadka lamented the amount of governmental changes in Peru, emphasizing the need for Peru to recover ground lost against peer mining countries, focusing on productivity and speed of regulatory processes to help bring prosperity to communities such as Cerro de Pasco. "There is an opportunity now to improve the health situation and economics in the region, but action must be taken, and a qualified neutral entity needs to take the lead," he concluded. ■

# Lithium and Uranium

## A NEW PLAYER ENTERS PERU

On May 11th 2021, American Lithium (TSXV: LI) finalized a deal to acquire Plateau Energy Metals and its Peruvian assets – the Falchani lithium project and Macusani uranium project. Plateau had been hit with a double whammy in recent years, as a downturn in the lithium market coincided with legal issues relating to a number of its concessions.

However, the acquisition promises to breathe new life into two projects that have the potential to diversify Peru's mining industry into critical minerals required for the transition to a low-carbon economy. "With better access to capital, we believe these assets can move quickly through the development phase and create significant value for all stakeholders," stated Simon Clarke, CEO of American Lithium.

Indeed, Falchani and Macusani will now have far better access to capital, considering American Lithium was the best performing mining stock on the TSXV in 2020, moving from under C\$0.20 in early April 2020 to over C\$4.00 in February 2021 to top the annual TSX Venture 50 list.

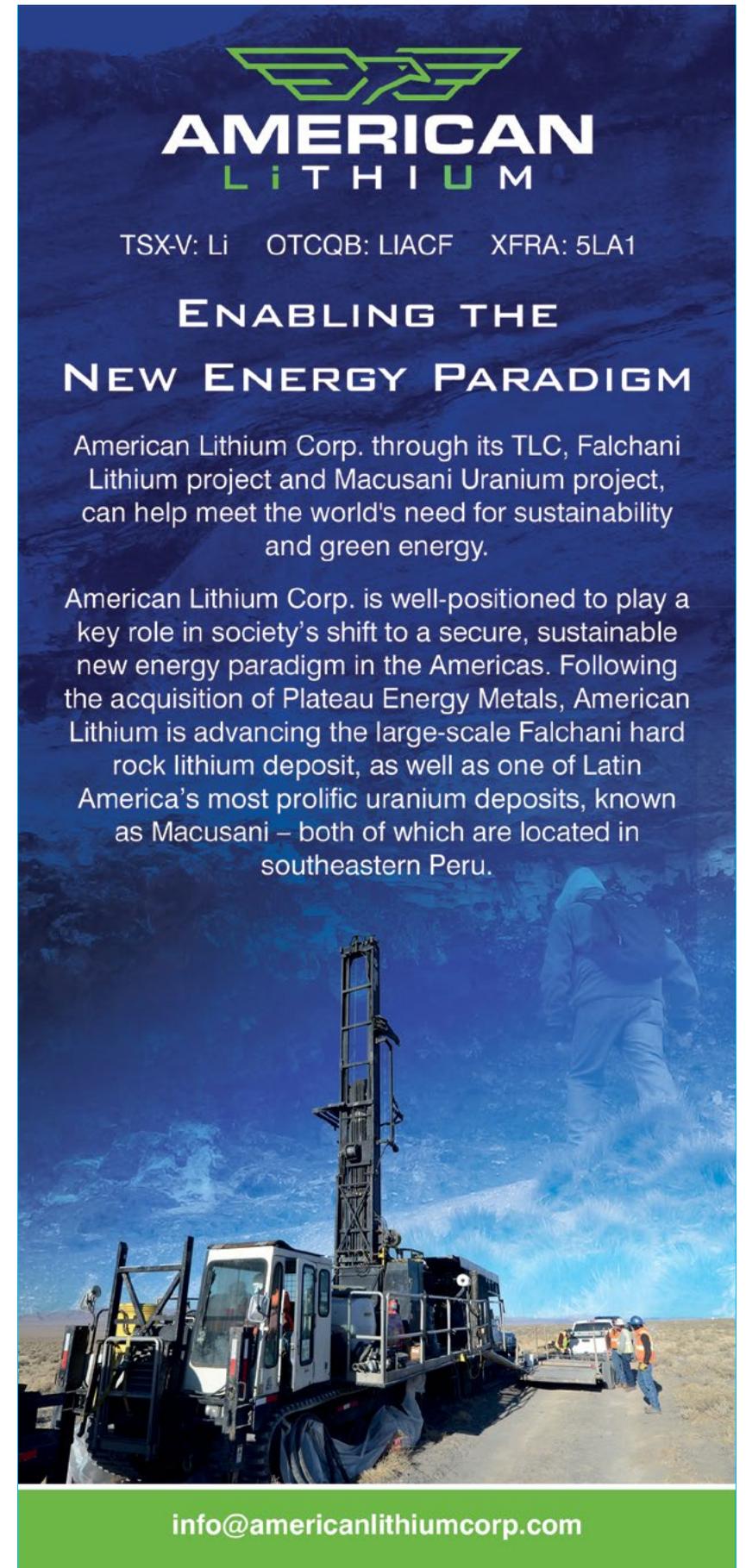
The company intends to replicate the success it has had at its TLC claystone deposit in Nevada, and to do this they have maintained the core of Plateau's Peru-based team, including Laurence Stefan as president, COO and director, as well as over 15 people on the ground, including general manager Ulises Solis.

Elaborating on the company's plans for Falchani, Clarke explained that a drilling campaign would take place to further expand the existing resource and to

upgrade resource classification (moving inferred resources to measured and indicated). "Recent work has also identified at least two other key target areas to the west of the Falchani deposit that have the potential to be similar in size and scope to Falchani. We will be launching exploration drilling in these areas over the next several weeks," he said, before commenting that work done in 2021 will help American Lithium position the project to move into the feasibility process in the first half of 2022.

Clarke also underlined that the company sees a lot of potential at Macusani, suggesting that the amount of third party interest they have received in the asset in the wake of the transaction is validation of its value. "Uranium is being more and more accepted as a key energy metal and Macusani is the fifth largest undeveloped uranium project on the planet," he remarked, noting that there is scope to add additional resources through further expansion drilling at Macusani, which the company plans to do near-term.

Clarke clarified that American Lithium was committed to utilizing Peruvian expertise to develop the projects, which he believes will help put Peru on the map in the area of energy metals and clean energy. Although the relationship between Peruvian politics and mining has been turbulent, the potential to create jobs and establish a previously untapped source of resources key to a green economy is a tantalizing prospect. ■



**AMERICAN LITHIUM**

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NEW ENERGY PARADIGM**

American Lithium Corp. through its TLC, Falchani Lithium project and Macusani Uranium project, can help meet the world's need for sustainability and green energy.

American Lithium Corp. is well-positioned to play a key role in society's shift to a secure, sustainable new energy paradigm in the Americas. Following the acquisition of Plateau Energy Metals, American Lithium is advancing the large-scale Falchani hard rock lithium deposit, as well as one of Latin America's most prolific uranium deposits, known as Macusani – both of which are located in southeastern Peru.

[info@americanlithiumcorp.com](mailto:info@americanlithiumcorp.com)



## Steven Zadka

Executive Chairman  
CERRO DE PASCO RESOURCES

### How does CDPR intend to advance the Cerro de Pasco mine?

Since signing the agreement to acquire the Cerro de Pasco mine from Volcan and Glencore in November 2019, there have been several extensions pushing back the transaction. It is a very large mine with legacy issues, and a complex situation. As we could not align a workable deal to satisfy all parties, we decided not to extend the agreement at the end of October 2020.

We are now looking at establishing a partnership instead, as there are legacy issues that belong to Volcan and Glencore that must be adequately understood and ring-fenced prior to any agreement. We continue to believe it would be advantageous to Cerro de Pasco for CDPR to reintegrate and operate the whole mine, as the asset would benefit from a new management team looking at the operation holistically.

### What are the main challenges surrounding the mine and the Cerro de Pasco community?

CDPR, Volcan, Glencore and the Cerro de Pasco community all agree that this is a unique problem which needs a holistic solution. There are economic, environment and health issues in play, and they need to be addressed together as one package instead of working piece by piece, as has been happening over the past 20 years. All the water systems are connected, for instance, so the open-pit is hydrologically connected with the stockpile and the tailings.

We brought in Bernhard Dold as CTO in 2020. He is one of the world-renowned experts on mine closure and acid mine drainage. He has studied Cerro de Pasco, and over 30 scientific publications on the region, and the consensus is that the health problems will not be fully resolved unless you reprocess waste and move people out of the most affected areas. There is still a lot of value left in Cerro de Pasco, but it needs to be done strategically, step by step, which is what we propose to do. ■



## Simon Clarke

CEO  
AMERICAN LITHIUM

### What prompted American Lithium to acquire Plateau Energy Metals in 2021?

Plateau was hit with a double whammy during the downturn in the lithium space over the last few years, which coincided with some legal issues they had relating to some of their concessions. We started talking to them in December 2020, and realized the deal made a lot of sense with a strong fit between the companies. American Lithium has a strong supportive shareholder base, and Plateau had a somewhat fatigued shareholder base, and lacked the capital needed to advance their development stage projects over the last couple of years. Both Falchani and Macusani are at advanced PEA stage and the Plateau team has already produced battery grade lithium from Falchani. With better access to capital, we believe these assets can move quickly through the development phase. In addition, Plateau has a very strong technical team, which will help round out our team and bring more expertise in-house. Falchani is a volcanic tuff with different geology to TLC, but it is also near-surface and shares similarities with a lot of the flowsheet work we are doing in Nevada which will be directly relevant.

### How will the transition from Plateau to American Lithium work from an operational standpoint in Peru?

One of the key attributes of the acquisition is that we are able to bolt on a very strong Peru-based team. At Falchani we will shortly be drilling to further expand the existing resource and moving inferred resources to measured and indicated. Recent work has also identified at least two other key target areas to the west of the Falchani deposit that have the potential to be similar in size and scope to Falchani. We will also be launching exploration drilling in these areas over the next several weeks. Work done in 2021 at Falchani will help us position the project to move into the feasibility process in the first half of 2022.

### What are your plans for the Macusani uranium project?

Although we are not uranium specialists, we see a lot of potential at Macusani. Uranium is being more and more accepted as a key energy metal and Macusani is the fifth largest undeveloped uranium project on the planet. There is also scope to add additional resources through further expansion drilling at Macusani, which we plan to do near-term. Macusani has seen a significant amount of work and investment historically and had a C\$120 million market capitalization when it was the stand-alone asset in the company back in 2008/9. We have already had a lot of third party interest in this asset, which is strong validation of its current value and long-term potential. Long term we may not be the ones to move Macusani into production, but we want to do more work on it, continue its development and continue to grow its value to the benefit of the company and all stakeholders.

### Do you have a final message for the Peruvian mining community about American Lithium's commitment to develop the Falchani project?

We are fully aware of the need to bring jobs to communities and develop projects in a sustainable manner, even more so in a post Covid world, and this is a key part of the corporate culture at American Lithium and was also the culture at Plateau Energy Metals. All our projects are being developed with a focus on implementing the best environmental practices and utilizing local expertise and workforces to the full extent possible. Peru has a very strong mining sector, and we are fortunate to have a lot of Peruvian expertise in the company to help advance what we think are first-rate projects which we believe will help put Peru on the map in the area of energy metals and clean energy. Peru remains significantly under-explored and we are fully committed to the country, its people, and helping to develop this potential in the years to come for the benefit of all stakeholders. ■

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We are fortunate to have a lot of Peruvian expertise in the company to help advance what we think are first-rate projects that will help put Peru on the map in the area of energy metals and clean energy.



# ENGINEERING, CONSTRUCTION & CONSULTANTS

"Large projects are a multidisciplinary challenge, and their development must include all the stakeholders; local communities, governments, clients, and employees, and these groups cannot work in silos"

- Gonzalo Covarrubias,  
General Manager,  
WSP Peru



# Engineering & EPCM

## ESG IS DRIVING CORPORATE STRATEGY AND M&A GROWTH

M&A in the engineering and consulting space has continued at pace in recent years, and in 2020, companies that specialize in areas of environmental, social and corporate governance (ESG) were acquired by multinational firms on the back of the incremental rise in demand for ESG-related services.

In December 2020, Canadian multinational services firm WSP entered into an agreement to acquire Golder Associates, a global engineering and consulting firm that provides earth science and environmental services. In a statement, WSP announced that the acquisition, due to be completed in the first half of 2021, ideally positions the company's strategic environment platform to capitalize on ESG trends.

WSP has completed more than 120 M&A deals globally since 2006, and Gonzalo Covarrubias, general manager of WSP Peru, explained that adapting to the culture of the acquired companies, without affecting their essence, is key to a successful business integration.

On the Golder transaction he stated: "The acquisition provides us with the ability to become the leading firm in the environmental earth science sector, which is part of our long term strategy. We are going to be the largest environmental and earth science team globally, consisting of around 14,000 employees in the world."

In 2017, multi-national EPCM company Ausenco acquired Canadian environmental consultancy Hemmera, which has been working with the Ausenco's South American business to implement

*We hope the trend Yanacocha is starting with their large underground sulfides project will be replicated by other big mining companies in Peru. These projects often have fewer environmental impacts which facilitates community acceptance and permitting.*



**- Alberto Coya,**  
**General Manager –**  
**Peru & Regional Manager – LatAm,**  
**Stantec**

the latest environmental practices and technologies, according to Alexandra Almenara, the company's VP of environment and sustainability for South America. Zimi Meka, Ausenco's co-founder and CEO, affirmed that this area of the business is a target for further M&A: "We will be looking to grow our consulting business, in particular in environmental services, and we are looking closely at potential acquisitions."

Considering the lack of major greenfield projects in Peru's pipeline, engineering firms are also focusing on project optimization to take advantage of robust metals prices. Ausenco recently completed the design and construction of Mina Justa, and is now transitioning to support Minsur in the startup of the operation, revealed Florencio Castro, Ausenco's general manager in Peru. Castro explained the next steps after the commissioning phase: "In the operation phase we have a group in charge of asset optimization and management of maintenance plans. We also have our own specialized software called Orien, which is a cloud-based management solution that helps to operate and maintain mining assets efficiently."

Franco Pedraz, Worley's country manager for Peru, related that the company is currently working on nine projects in Peru, ranging from definitive feasibility studies for greenfield copper projects, to the expansion of onsite and offsite infrastructure. Pedraz asserted his intention to enhance Worley's sustainability-focused services in Peru and emphasized the importance of establishing

professional development in mining regions. "We must continue to observe that Peru is an emerging economy and the relationship between the mining sector and communities is key to the success of an operation," he said, elaborating: "There will be the implementation of critical automation, but not all operations will become completely digitized as we still need the human element for a lot of mining processes, as well as job creation."

Alberto Coya, Stantec's general manager for Peru and regional manager for LatAm, suggested that the expected increase in larger underground mining project, embodied by Yanacocha's planned transition from oxides to sulfides, could help the country's mining industry from a social standpoint. "We hope the trend Yanacocha is starting with their large underground sulfides project will be replicated by other big mining companies in Peru," said Coya, adding: "These projects often have fewer environmental impacts which facilitates community acceptance and permitting."

### Remote studies and local expertise for brownfield expansions

The majority of the mining value chain suffered during lockdown in 2020, but certain sub sectors were more able to adapt than others. In the engineering space, the move to remote work was more seamless than for boots-on-the-ground contractors, as a laptop-based

workforce quickly adapted to home office conditions. In fact, for those familiar with rush-hour Lima traffic, the transition to remote operations came as a welcome development.

"BISA has moved from a large office in Lima to a work-from-home policy, which we have found has really helped the productivity of our workforce," said Federico Schwalb, CEO of BISA Ingeniería de Proyectos (BISA), who revealed that the Peruvian engineering company has decided it will not go back to a large office environment, but will use a co-working facility with a smaller capacity in the future.

"Even though our revenue dropped 5% in 2020, our EBITDA (Earnings Before Interests, Tax, Depreciation and Amortization) increased 40% in the same timeframe due to increased productivity and reduced costs," added Schwalb. Companies with a strong local presence also benefited from having in-country expertise, as travel restrictions prompted mining companies to contract engineers that could conduct site visits without having to bring in workers from abroad.

One such case was Peruvian copper producer Southern Peaks Mining, which awarded a contract to BISA to provide engineering, supervision, project controls and procurement for its Condestable mine expansion, having previously worked on the project with an international firm.

A lack of major greenfield projects on the horizon after Quellaveco, in part due to the permitting difficulties and social issues faced by miners in Peru in recent years, has placed a greater emphasis on brownfield work such as the Condestable expansion. It has also prompted engineering houses to offer a wider range of services, such as the Project Management Office (PMO) that BISA has renewed for a third year running with Antamina. A PMO helps provide guidance, raise flags, control costs, and utilize technology to monitor the progress and performance of an operation, explained Schwalb, allowing the mining company to focus on its core business of production optimization.

Denys Parra, general manager of Peruvian engineering firm, Anddes, which also has offices in Argentina, Brazil and Chile, spoke of the demand for Engineer of Record (EoR) services. An EoR requires a professional engineering firm to seal drawings, reports or documents for a project, and Anddes has been providing such services for Minsur, Glencore and Pan American Silver in Peru. Parra described how EoR services help implement solutions for the sustainability of operations, noting how they can allow mining companies to operate and monitor their facilities properly, including guaranteeing the safety of tailings dams in the medium and long-term by minimizing the risk associated to critical facilities. ■

*The idea to grow BISA's PMO (Project Management Office) service came from our experience at Newmont's Yanacocha project. There used to be a large project team with many disciplines at the mine, but we still needed to contract extra help in what we called a "salt and pepper" operation, with the mining company and contractor working together.*

**- Federico Schwalb,**  
**CEO,**  
**BISA Ingeniería de Proyectos**



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## Gonzalo Covarrubias

General Manager  
WSP PERU



**Can you tell us the reasons behind the decision to acquire Golder, and what this means for the company's Peruvian operations?**

Since 2006, WSP has completed more than 120 M&A deals globally. In December 2020, the company announced its intention to acquire Golder, a leading engineering and consulting firm with a presence in over 60 countries. The acquisition provides us with the ability to become the leading firm in the environmental earth science sector, which is part of our long-term strategy. By combining complementary service offerings and expertise in underground and above-ground engineering, we are ideally positioned to advise our clients and help them tackle challenges around climate change, environmental and social impact, biodiversity, environmental rehabilitation, environmental management and compliance. We are going to be the largest environmental and earth science team globally, consisting of around 14,000 employees in the world. The merger will also help boost our connection with mining clients in Latin America, as Golder has a strong client-base and

quality-driven reputation, complementing WSP's culture and values.

**Which of WSP's services have experienced high demand in the last 12 months?**

Our design and consulting services to tackle client challenges have seen an increase in demand. We also have a very robust PMO (Project Management Office) and we have strengthened this capability in Peru as well. The PMO model is becoming increasingly popular with public and private clients, and we expect this to gain traction in the coming years. As a result of the pandemic, we have been promoting services to improve the flow of personnel on and off site, to be more resilient and mitigate contamination risk in the future.

**Can you explain how WSP's consulting services help to create a long-term relationship between project, community and operation?**

As an industry, we need to clearly communicate why we mine metals – as they are vital for development; and how we mine metals – by having a responsible mining

## Florencio Castro & Alexandra Almenara

FC: VP – Peru  
AA: VP Environment & Sustainability – South America  
AUSENCO



FC



AA

**Can you provide an update of Ausenco's activities at Mina Justa, and describe how the company's services have evolved in the last year?**

FC: Ausenco recently completed the design and construction of the Mina Justa project, which is currently in ramp up phase. Our role now is to support the client in the startup and operation. Despite the difficulties posed by the pandemic, we managed to carry out this project on time and within the approved budget. From the point of view of design and execution, it has been remarkable due to its complexity, and it has followed the same path as other successful copper projects Ausenco has carried out, including our work at Constanca in Peru.

Despite Covid, Ausenco has been present in different phases of several projects, especially in the study phase. Ausenco has a wide portfolio of projects in Peru, and we view the future with optimism as we believe several projects will eventually advance towards construction encouraged by metal prices.

**What were the main findings of Ausenco's 2020 Sustainability Report?**

AA: Ausenco's 2020 Sustainability Report is the first that the company has produced, and therefore represents an important milestone. Its aim is to compile all our sustainability efforts in different projects and areas of the company, and with this constitute a baseline for our commitment in the future. Once we understand all the independent sustainability initiatives that we have within the company, we can start working on more specific, unified and company-wide measures.

**What are your clients' main concerns from an ESG standpoint?**

AA: Permitting is our Peruvian clients' biggest concern. Additionally, clients are increasingly requesting assistance to address ESG and to comply with International Finance Corporation (IFC) standards. Another big question that companies are raising is how to address climate change and become net zero, even though this is not required by Peruvian regulations. We

and strong relationships within the communities that we operate.

Large projects are a multidisciplinary challenge and their development must include all the stakeholders; local communities, governments, clients, and employees, and these groups cannot work in silos. Furthermore, how we exploit resources and develop future mining operations must consider climate change, wealth-creation for communities, and evolving technologies.

**Do you think the adoption of innovation has increased during the pandemic, and if so, which technologies have gained traction?**

We often assume that technology means more efficiency and less jobs, but in reality, technologies enabling remote services will open the door for a larger talent pool to enter the sector. For instance, opportunities will become more diverse and enable more women to also become part of the mining industry. The adoption of remote technologies also requires different skill sets, which gives new high-level capabilities to the miners. ■

are also working with many mining companies to implement the new Global Tailings Standard.

**Can you give examples of Ausenco's environmental and geotechnical solutions?**

AA: On the environmental side, Ausenco offers a wide range of services related to permitting, including environmental impact assessments (EIAs), compensation plans, concession permits, environmental monitoring, and closure planning. What sets us apart is that we have the capacity to provide an integral service of engineering, environmental and social services to any project at any stage of their life cycle. Ausenco also provides services related to water management and water balance. Lately, we have also been supporting clients with digital solutions and alternatives to present project information through virtualizations in a way that it is easy to understand for all the stakeholders. This is further complemented with our asset optimization, pipelines, transportation and logistics capabilities. ■

## Franco Pedraz

Country Manager – Peru  
WORLEY



framework where we rapidly assess the carbon footprint of a mine and design appropriate solutions. Through our consulting business, Advisian, we are heavily involved in the conceptual redesign of the entire energy mix and have experience and expertise across all renewable energy sources, including green hydrogen.

**What are some of the projects Worley's Peru office have been working on?**

Worley's Peru office is currently working on nine projects, ranging from definitive feasibility studies for greenfield copper projects, to the expansion of onsite and offsite infrastructure for the country's largest mining operations. Aligned to our sustainability objectives, our ore sorting technologies and dry stack tailings expertise are helping miners reduce their energy and water requirements for metals production. We are looking at specific processing technologies that improve metal recoveries in existing operations and enable the reprocessing of existing waste streams from previous operations for commercial gain.

**Do you think the digitalization at mine sites has increased due to the pandemic?**

Many miners currently use building information modelling (BIM) at evolving levels (3D, 4D and 5D). However, in the next five years the industry will likely progress to 6D and 7D models as a minimum. Data from real-time and historic sensors installed on the physical asset will allow miners to create a 'digital replica' of their mine. This is a simulated model of their operations and a working representation of the physical asset. Here sustainability, commissioning and efficient transition from construction to operations can come into play.

We must continue to observe that Peru is an emerging economy and the relationship between the mining sector and communities is key to the success of an operation. There will be the implementation of critical automation, but not all operations will become completely digitized, as we still need the human element for a lot of mining processes, as well as job creation. ■

# Mining Consultancies

## NAVIGATING SOCIAL AND REGULATORY COMPLEXITIES IN A DYNAMIC ENVIRONMENT

There is value to be gained from consulting local expertise, particularly in dynamic, unpredictable environments such as a country which has had five president in less than two years. Furthermore, the potential changes to legislation that could be brought in by the newly elected Castillo government will require careful consideration and navigation. In the mining business, this value has been illustrated by recent M&A, as the growth of the consulting arms of engineering and EPCM houses has been directed at specialized consultancies, particularly in the ESG sphere. One of the leading global mining consultancy firms, SRK, has been hiring Peruvian talent specialized in data handling, according to Antonio Samaniego, director of SRK Consulting Peru. This includes data surrounding satellite im-

ages, water levels and seismic information, to help meet an increased demand for technical proposals.

On the subject of what companies should be aware of when looking to invest in Peru, Samaniego reflected: "Peru offers several advantages for the mining industry, starting with a great geological context, highly qualified mining professionals and adequate logistic and supply facilities, besides the long mining tradition in the country."

On the regulatory side, he noted that Peru has comprehensive environmental regulations, but permitting and law enforcement are not effective, because the related bodies do not have enough qualified personnel. "Hence an EIA can take up to two years to be approved by the authorities," he observed, warning that companies active in Peru need to treat the social aspect very carefully.

Steve Botts, president of Santa Barbara Consultants (SBC), has over thirty years' experience in the mining industry, holding positions such as VP and managing director of Tahoe Resources Peru, general manager of Marcobre, and VP sustainability for AngloGold Ashanti Americas. In 2011, Botts created SBC to provide mining clients with consulting expertise in the areas of corporate strategy, mining life-cycle and safety, all incorporating ESG considerations, a theme that has grown exponentially in the decade since.

Elaborating on how the topic of ESG

has evolved in recent years, Botts spoke of how the management of environmental, health, safety, social and technical aspects within the mining industry are growing beyond just compliance and economics. "Issues such as carbon footprint reduction, climate change and renewable energy sources must be evaluated and factored into the life of mine plans, as well as integrating the mine with the needs of local communities."

On the topic of social bottlenecks that have slowed down project development in Peru, Botts listed the number one priority as effective communication: "Mining companies should engage with local communities as early as possible and promote dialogue regarding the community's long term vision and how a mining project could support this vision; in other words, involve the stakeholders in project planning instead of trying to impose the project." A sense of buy-in and support from local stakeholders will come if communities can see the economic benefits of the project, and if it is clear that the project will not negatively impact the environment, he added.

Pablo Saravia Magne, partner and mining leader at PwC Peru, revealed that over the last four years, the company's portfolio of services has expanded as the industry was presented with new challenges and risks. One of PwC's main service demands in Peru has been

social management and community relations, which is focused on controls and risks. Magne outlined the two main social concerns of PwC's clients: "The first is related to the controls around the procedures regarding giving funds to local communities, as there have been fraudulent activities during these kind of transactions. The second concern is related to tax implications with regard to community relations, as some community expenses can be deducted for tax purposes and some cannot." He added that PwC provides services which identify and then evaluate the effectiveness of these controls. Orlando Marchesi, country senior partner at PwC Peru, expanded on the issue: "There is a link between risk controls and tax, because in order to deduct social responsibility expenses you have to be able to show beyond reasonable doubt that the expenses are incurred in the communities where the mine is located."

Why does the complexity surrounding social licensing for mining projects in Peru exist, and what could be done by the private sector to improve the process? Marcial García, partner and mining lead at EY Peru, observed that many of the companies in Peru that struggle with social licensing have been around for decades, and sometimes have a bad reputation due to legacy issues or because they are located in a region where there has been historical conflict between mining and communities. "On the other hand, companies which have entered the Peruvian market recently have been successful in obtaining their social license to operate," he noted, affirming that establishing good relationships with the community from the start is key to accelerate the process. "Peru has all the conditions to be a very attractive destination for mining investment," reflected García, listing rich geology, untapped exploration potential, low cost of production, low power costs and a well-trained workforce as its advantages, "but addressing the social and permitting issues is paramount for the country to fulfil its potential."

Paul Murphy, manager of the South America region for Australian mining technical services provider, Mining Plus, opined that the geological po-

tential of a region is number one when looking for projects, but it should be closely followed by the ease of doing business and the ability to move a project forward in a country. "In a general sense, Peru ticks most of the boxes for investors. It is extremely well endowed with mineral wealth and a good place to do business, but even so, I expect some investors are put off by the permitting challenges, especially for early-stage projects."

Another Australian-headquartered mining consultancy, AMC Consultants, has worked in Peru for the likes of Gold Fields, Las Bambas, Hudbay, Marcobre and Glencore, according to Francis McCann, general manager of AMC's Toronto office. Acknowledging that Peru presents some challenges due to political instability over the past couple of years, McCann believes the country is attractive for service companies due to its geological endowment and wide range of mining companies producing a breadth of work.

In 2020, AMC formed an advisory division to provide specialized services in areas such as performance diagnostics, strategy optimization, geometallurgy, and value engineering, which the company has been experiencing high demand for since their launch. Discussing the optimistic outlook for metals, McCann suggested the industry should be cautious to not repeat the mistakes of the previous upcycle when a number of companies chased metal prices. "Mines need to really understand the cycle and develop a thorough strategy optimization process instead of a scenario optimization process. Complete strategy optimization helps reduce risks by positioning oneself to be relatively stable across the price cycle so as not to be reliant on one scenario," he explained, concluding that strategizing in such a way means that one can take advantage of the peaks, while protecting oneself from the lows, which will inevitably come in a cyclical business. ■

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## Antonio Samaniego

Director  
SRK CONSULTING PERÚ

**When we last spoke in August 2020, Covid had restricted a lot of the field work. How have things evolved since then, and which of SRK's services have been in high demand?**

There has been little activity related to field works, mainly because most of the constraints to accessing the sites are still in force. We have continuously searched for alternative strategies, such as the implementation of advanced video conference tools, the use of remote sensors and satellite info, and works with drones. In parallel, we have needed to hire qualified staff in the handling of these tools and to improve our IT infrastructure. In the last months, we have been busy mostly with works related to project evaluation, bankable reports, geotechnical assessments, mine closure plans, and big data processing. We have noted an increment of requests for proposals as mining companies are catching up with work from the past.

Despite the difficulties of the pandemic, 2020 ended up being quite a good year for SRK. We did a good job retaining and recruiting talent and had good results in Peru.

**Can you give us examples of some of the technical study work SRK has been doing in the last year?**

We are focused on the development of technical reports according to S-K 1300 regulation, which will be mandatory for all NYSE listed mining companies after January 2022 to support their reported mineral resources and reserves. We consider that this regulation is one of the most strict and demands a high technical level for its preparation. SRK Peru is supporting three world-class companies in this process in collaboration with Denver (USA) and Belo Horizonte (Brasil) offices. In SRK Peru, we have also been involved in mine closure plans for some of the very large gold operations.

**Have you seen more activity in the junior segment considering the high metals prices?**

We have seen more activity from the junior segment, and we have been working on a number of PEA studies for juniors in Peru, as well as some pre-feasibility studies. However, the current

political situation and some limitations due to the pandemic (such as delays in the vaccination process) have limited the growth of activities and investment of junior mining companies in Peru. Additionally, as part of M&A processes, we have done technical and economic due diligence for banks and mining companies, which implicates junior companies commonly.

**Can you tell us about your participation with the Global Mining Professionals Association (GMPA), and SRK's expertise when it comes to tailings management?**

In Peru we are advancing on the Global Action on Tailings (GAT). This initiative has been developed under the GMPA sponsorship. Our idea is to propose strategies for an adequate tailings build, management and close. The SME, a GMPA member, is working on a tailings handbook that should be published over the last months of 2021. The handbook will cover new topics that we need to look at when looking at tailings management, such as climate change.

**What advice would you give to mining companies looking to invest in Peru about how they should prepare for the early stages of a project?**

Peru offers several advantages for the mining industry, starting with a great geological context, highly qualified mining professionals and adequate logistic and supply facilities, besides the long mining tradition in the country.

The energy supply has improved over the last years, in terms of capacity and cost, however, a number of challenges on other infrastructure fronts, mainly the ports, roads and rails, continue.

On the regulations side, Peru has a comprehensive environmental regulation, but permitting and law enforcement is not effective, because the related government entities do not have enough resources, hence an EIA can take up to two years to be approved by the authorities.

Finally, companies need to treat the social aspect very carefully in Peru.

Taking into consideration all aspects, I consider Peru is still one of the most attractive countries for investment in the mining industry. ■

We have noted an increment of requests for proposals as mining companies are catching up with work from the past.



## Steve Botts

President  
SANTA BARBARA CONSULTANTS

**How have mining processes been adapted to place a greater emphasis on worker health and wellbeing instead of just injury prevention?**

Most mining companies have done a good job in terms of managing occupational health; however, the Pandemic was a real wake up call to the entire industry, and we noticed a much greater demand for our occupational health expertise and services. For example, in pre-pandemic times, it was relatively easy to schedule workers on different turnarounds and shifts. The Pandemic brought about a sharpened focus on all aspects related to the movement of employees; not just at mine sites, but also while workers are at home with their families. Remote work has also advanced, such as mine dispatch centers from home offices, and I believe this trend will continue even when the virus is under control.

**What advice would you give to companies in Peru regarding social bottlenecks and permitting?**

The number one priority in terms of managing the social aspects related to mining is effective communications with stakeholders. Mining companies should engage with local communities as early as possible and promote dialogue regarding the community's long term vision and how a mining project could support this vision - in other words, involve the stakeholders in project planning instead of trying to impose the project. At the end of the day, the communities and governments have the final say, and without their approval you will not be able to start operations even if you have permits, as we have seen in the cases of Minas Conga, Tambo Grande and most recently, Tía María. A sense of buy-in and support from local stakeholders will come if they can see the economic benefits of the project, and if it is clear that the project will not negatively impact the environment.

Exploration and mine permitting in Peru present a similar challenge that also requires proactive communications; conversations with the regulators should be started early and intentions outlined clearly. Permit applications should be prepared professionally and the project proponents should be willing to meet with the regulatory authorities and communities so they fully understand the project. It is important to have realistic expectations regarding the permitting timeline, as the permitting process can be bureaucratic, complicated and highly unpredictable, and in addition, the process has been further complicated by the Pandemic.

**What would you say differentiates Santa Barbara Consultants from some of the bigger mining consultancies?**

Santa Barbara Consultants is a team of "miners helping miners". A majority of our team has worked for mining companies and have grown into the consulting space. This gives us practical expertise related to both mining operations and projects, in addition to hands on technical experience in managing the challenges faced by mining companies in Latin America.

**How are you planning on growing the company in the coming years, and which areas of the business do you see as having good potential for growth?**

Santa Barbara Consultants is always looking for new talent, especially for professionals that have hands on experience in mining projects and operations. We are very selective concerning the people we choose, not only from the point of view of qualifications and experience, but also finding people that match our values and fit with our culture.

The management of environmental, health, safety, social and technical aspects within the mining industry is growing beyond just compliance and economics, and issues such as carbon footprint reduction, climate change and renewable energy sources must be evaluated and factored into the life of mine plans, and integrating the mine with the needs of local communities. We believe that these areas offer tremendous opportunities for growth in the coming years, supported by the robust outlook for metals usage in the green economy. ■

At the end of the day, the communities and governments have the final say, and without their approval you will not be able to start operations even if you have permits, as we have seen in the cases of Minas Conga, Tambo Grande and most recently, Tía María.

## Francis McCann

General Manager – Toronto  
AMC CONSULTANTS



### Which of AMC's services have been in high demand over the last 12 months?

During 2020 the company officially formed an Advisory division to provide specialized services in areas such as performance diagnostics, strategy optimization, geometallurgy and value engineering. These services have been in high demand since their official launch.

### To what extent do you think the pandemic has accelerated the implementation of digital solutions in the mining industry?

There has been a digitalization trend within the mining industry for years, which has been accelerated by the pandemic. We are seeing that some companies are faster to adapt and adopt than others. In my opinion, technology is great, but technology just for technology's sake does not necessarily support or add benefit. You have to think about technology strategically, how you want to use it, and if it can be used to the extent that it provides you with the right information. I believe that technologies that support automation, remote operation of equipment and iROC type centers are areas where the industry can get the most value for investment ■

## Marcial García

Partner and Mining Lead  
EY PERU



### Which fiscal incentives has the government introduced to stimulate exploration in recent years?

The VAT early recovery system for exploration projects is an incentive that is very attractive to investors. Everything bought in Peru is subject to VAT at a rate of 18%. If you have an investment project of over US\$500,000, you can apply to the early recovery system and you are refunded the VAT. This is an incentive to promote greenfield projects in Peru and the rationale behind the system is that you use the money to re-invest in operations. Over the last few years, no other incentives have been approved and no significant new legislation has been passed.

### How do you think Peru could promote itself as a more stable mining country?

We have a lower cost of production compared to other countries in the region and lower power costs than Chile. We have well-trained professionals in the industry such as engineers and geologists. Peru has all the conditions to be a very attractive destination for mining investment, but addressing the social and permitting issues is paramount for the country to fulfil its potential. ■

## Paul Murphy

Manager – South America  
MINING PLUS



### Can you elaborate on the different mining methods suited to different scale underground projects?

The mining method is primarily dependent upon the geometry and scale of the ore body. Most experienced mining professionals will have a reasonably good idea as to the appropriate mining method for a deposit, but the mining method tradeoff is always critically important, as every deposit is different, and you can either make your life very easy, or very difficult depending on the mining method you select. Speaking in a general sense, if you have a vein deposit, mining methods such as variants of cut and fill or a long hole stoping would likely be appropriate. For a larger disseminated deposit such as a copper porphyry, a bulk underground mining method such a block cave would likely be appropriate, especially if the deposit is relatively low grade. With respect to the bulk mining methods, there really needs to be a change in mindset for those not experienced in bulk underground mining, because the scale and capex required for these types of operations is far greater than other underground mining methods. Large scale bulk underground mining operations are more like large open-cut projects with respect to the capital profile, where US\$1 billion could be spent on the project before you generate any revenue. As such, it is critical to get it right the first time if you are to embark on a project such as this. ■

## Environmental & Tailings Management

In the wake of the Brumadinho tragedy in 2019, the International Council on Mining and Metals (ICMM) conducted a multi-stakeholder review with investors and the United Nations Environment Programme (UNEP) that resulted in the Global Industry Standard on Tailings Management, launched in August 2020.

The investigation led by the Investor Mining & Tailings Safety Initiative revealed that around a tenth of tailings dams – 166 of the 1,635 dams studied — have had safety issues in the past. Considering there are over 3,500 tailings dams globally, the challenge at hand will require buy-in from all parties, and not just the major ICMM members. Rohitesh Dhawan, CEO of the ICMM, affirmed that the Council's main priority is to continue enabling the global industry to take up the new Global Industry Standard on Tailings Management, for which a Good Practice Guide as well as Conformance Protocols have been launched in 2021. "Our ambitious goal is to find solutions that will significantly reduce or directly eliminate tailings in the first place," he added.

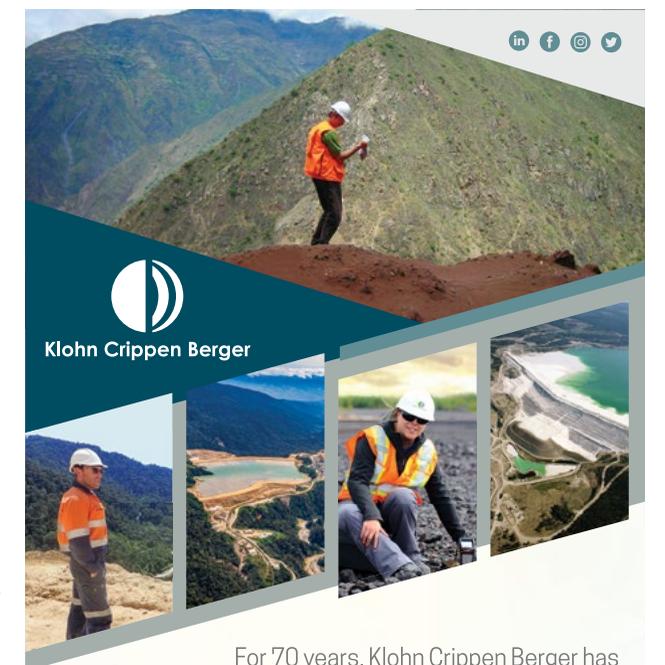
The Investor Mining & Tailings Safety Initiative was established by a group of asset owners and fund managers including the Church of England Pensions Fund, the New Zealand Superannuation (NZ Super), as well as Swedish and Dutch pension funds. The current group now controls over US\$24 trillion in assets, according to Adam Matthews, investment team director for the Church of England Pensions Board, and co-chair of the Investor Mining & Tailings Safety Initiative. He stressed that "investors do not invest in a vacuum" and sector-wide reform is necessary if mining companies expect to retain investment.

At the forefront of this reform are the engineering firms and services related to mining waste. Dan Etheredge, general manager of Klohn Crippen Berger's (KCB) South American office in Lima, revealed that 2020 was one of the most active years ever for the engineering firm that specializes in tailings management, and credited the Global Tailings Standard for generating more awareness on the subject. Etheredge commented that the bulk of KCB South America's projects are tailings related, such as seismic hazard assessment updates and site selection studies, and commented on how clients have started taking a more long-term approach in their thinking.

"For example, they have 10 years capacity left on their existing facility and want to know what their options are moving forward – do I go to a new facility, or do I raise the dam of the existing facility?," said Etheredge, adding: "Thoughts are

also moving more towards lowering risks profiles – instead of having one massive structure with an extreme consequence classification, analyzing the impact of a couple of smaller structures with lesser classifications."

Peruvian mining contractor Pevoex has also seen an uptick in demand for tailings work, particularly for tailings dam expansion projects, according to general manager Rómulo Mucho. "These projects are highly technical as they involve a critical facility with associated risks, as seen with the dam failures in Brazil in recent years," said Mucho, who spoke of the strict criteria for projects including Quellaveco, for which Pevoex is a subcontractor of the company building the tailings dam. Mucho added that the industry is adopting solutions like filtered tailings, for instance at Cerro Lindo, but the cost of such



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solutions make them more applicable to projects with lower volumes.

When it comes to the design of modern tailings facilities or upgrades to existing facilities, water use is at the crux of the matter. The previous mainstream method of tailings management, subaqueous deposition as used at Brumadinho, is being replaced by dry stacking, a method which permits the recovery of the maximum amount of recycled water but requires more capex.

Amphos 21, the Spanish company acquired by RSK Group on December 28th, 2020, covers a wide range of services inside the water cycle including environmental studies and how water is integrated throughout the life of a mine.

Eduardo Ruiz, general manager of Amphos 21, expanded on a number of the long-term projects the company is currently involved in in Peru: "We are working in dewatering activities for Antamina, in tailings reuse, and in the dewatering process of Minsur's tailings facility. Not only do we work in consulting and engineering, but also in the design of solutions so we can provide engineering, procurement, and construction for clients."

Amphos 21 recently won the Smart Catalonia Challenge competition for using technology based on machine learning to improve the management of water quality, noted Ruiz, remarking that the company is currently applying this type of technology in a similar project in Peru.

The issue of mining waste is growing incrementally as mines increasingly extract lower grade ore. Such a large-scale problem requires cross-industry R&D to generate solutions. French company Elydan, with broad experience in providing solutions for landfills across Europe and Latin America, is now bringing its experience to the mining industry, according to Francisco Pizarro, Elydan's composites commercial director for Latin America. Pizarro explained how Elydan's drainage geocomposites can replace part of the soil or rocks that are used for drainage in tailings dams, leach pads or any solid structure that can suffer from saturation, with a thin but ef-



*Tailing dams suffer a lot from pore pressure and the soil can become extremely saturated. Drainage geocomposites, in conjunction with other geosynthetics, line the bottom of the dam to reduce any pore pressure which could affect the stability of the structure. The Brumadinho dam disaster in Brazil is the best case to promote this solution, as the main fault that occurred was a lack of proper drainage.*

**- Francisco Pizarro,  
Composites Commercial Director –  
Latin America,  
Elydan**



ficient product. "Tailing dams suffer a lot from pore pressure and the soil can become extremely saturated. Drainage geocomposites from Elydan, in conjunction with other geosynthetics, line the bottom of the dam to reduce any pore pressure which could affect the stability of the structure."

Using the example of Brumadinho, where the main fault that occurred was due to a lack of proper drainage, Pizarro emphasized the value of geosynthetics to solidify mining sites structures. He revealed that Elydan is currently doing a year-long test trail of 1,000 square meters of drainage for a tailings dam in Chile, with the possibility to install 100,000 square meters of the solution once the trial has been successful. ■

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**Eduardo  
Ruiz**

**General Manager  
AMPHOS 21 PERÚ**

**Amphos 21 was recently acquired by the RSK group. What does this acquisition mean for the company?**

This has been excellent news for us, as it confirms the great trajectory of our company and allows us to be part of a strong group with a powerful presence in Europe and internationally. The group works in areas related with the environment and has services which were not yet inside our portfolio.

RSK is a very flexible group which respected our structure and working style, therefore, our structure has not changed, our management team remains the same, we have not changed our brand and we have become integrated under RSK's international division. The strategy of the group is to grow organically with its brand and inorganically with companies that can complement its service offering. Growth in mining in Latin America is part of the company goals for coming years.

**Which services are you planning to introduce in Peru's mining sector?**

RSK Group has a strong experience working in areas related with the environmental assessment, water cycle climate change, renewables, digital transformation and remote sensing. It also has huge expertise on environmental remediation, which is closely related to our day-to-day activities such as mine closure or the management of environmental liabilities. We believe we will be able to incorporate many of these services in Peru.

**Can you give us details about some of the current projects you are working on?**

I would mention those related with essential activities, which helped us greatly during the pandemic; examples on this are dewatering activities for Antamina or associated to tailings reprocessing for Minsur. Also closure activities and optimization of waste (acid) water for some of our key clients such as Buenaventura group. Not only do we work in consulting and engineering, but also in the design of solutions so we can provide engineering, procurement and construction for clients.

**Amphos 21 was recently awarded the 1st prize of the Smart Catalonia Challenge. Can you elaborate on the importance of R&D for the company?**

Amphos 21 has always had a strong focus on research, development and innovation which comes from Spain, and since the beginning, we have been linked to European investigation programs. We are proud that we recently won the Smart Catalonia Challenge competition for using technology based on machine learning to improve the management of water quality. We are currently applying this type of technology to improve our services in a pilot project in Peru.

We believe the development of machine learning, Artificial Intelligence and Internet of Things is where we should head, in order to improve the safety of mining operations and to reduce costs. At Amphos 21, we aim to be early implementers of these technologies into the water cycle, and even develop these technologies if possible. We have made investments in this sense for several years, and fortunately, we have sustainable clients who trust us to carry out pilot projects.

**What are the company's goals for the coming years and what growth potential do you see in Peru?**

Mining is a large part of Peru's economy and there will be great opportunities for growth in this sector, especially if the country manages to continue on the path it has followed for years of attracting foreign investment. There is significant potential to optimize water processes in the mines, and new technologies will help with this. Amphos 21 has experienced constant growth for many years, even in 2020, and we expect to continue growing, providing solutions to the mining sector. After our company's acquisition by RSK, there is great potential to develop and incorporate new services and product lines in Peru.

Amphos 21 was born with a vocation to innovate. We have many years of experience and this gives us an excellent learning curve. In addition, clients are always at the center of our activities: we listen to them, understand their problems, and help them with the development of the solutions they need. Our aim is to be their long-term partners and create value for them. ■

**We recently won the Smart Catalonia Challenge competition for using technology based on machine learning to improve the management of water quality. We are currently applying this technology to improve our services in a pilot project in Peru.**



## Dan Etheredge

General Manager – South America  
KLOHN CRIPPEN BERGER

### How was 2020 for Klohn Crippen Berger (KCB) in South America?

Surprisingly, 2020 was one of KCB's most active years ever, and we surpassed our plans and budgets that were made pre-Covid. We were in that weird position where nobody likes to turn away work, but we had to be truly selective as we could not accommodate all the requests. We have been actively hiring, but the market is competitive.

Because of the work KCB did in response to the recent high-profile dam failures, our profile in Brazil has expanded significantly and we have received more work, including dam break studies and risk reviews and assessments.

### In August 2020, the Global Tailings Standard was launched. Do you think it has improved the state of tailings management?

The launch of the Global Tailings Standard was great for the industry and for KCB as well. The company is considered at the top end of tailings engineering consultancies and the standard has raised our profile, as we have always been an advocate for tailings design and management stewardship. The majority of companies, especially the multinationals, are taking tailings more seriously with a more conservative approach.

### What type of tailings projects has KCB been working on in South America, and what are clients currently asking for?

The bulk of KCB South America's projects are tailings related, including seismic hazard assessment updates, site selection studies for new facilities, tailings technology trade-off studies, and dam raise designs. People are starting to take a long-term approach in their thinking. Thoughts are also moving more towards lowering risks profiles – instead of having one massive structure with an extreme consequence classification, analyzing the impact of a couple of smaller structures with lesser classifications, or changing tailings technologies to thickened or filtered tailings, for example, to reduce risk.

KCB has been working with the full range of clients between juniors, intermediates and majors. Hochschild has been a client of ours for years and we continue to do a significant amount of work for them, both on new facilities and closures. When a new client approaches us, we look at their policies and standards to establish if we can set up a working relationship.

### What are the benefits of dry tailings deposits compared to the traditional subaqueous deposition method?

Traditional tailings is a slurry, and there are a significant number of considerations – seepage, filtration, spillways, excessive storm events, etc. are all potential risks that need to be managed. There is definitely less risk with a dry stack facility. For example, runout, if it were to occur, is going to be significantly less with a dry stack deposit, obviously depending on the size and profile of the facility, but up to a couple kilometers as compared to the 100+ km potential of a conventional tailings facility. Although the capex is usually higher, the risk profile of a dry stack deposit is significantly lower.

### When is the best time for companies to consider tailings issues?

The best time to consider tailings is before the mine is built. If you have a mine with dozens of years of useful life, you really need a roadmap for the future. It will be beneficial to have a long term planning group looking at various scenarios which can then be analyzed from various perspectives – technical, financial, and social. In planning ahead, you can do a multiple accounts analysis of what your options are and have a significantly better plan and idea moving forward so that you do not have to make snap decisions. With advancements in technology, companies can improve not only design standards and criteria, but also take into consideration closure scenarios way before they get to that point. Considering all scenarios in advance enables you to select the best option and you are not forced into picking a less optimal alternative. ■

With advancements in technology, companies can improve not only design standards and criteria, but also take into consideration closure scenarios way before they get to that point.

## Construction and Contractors

### ON THE FRONTLINE IN A REMOTE WORLD: THE EVOLVING ROLE OF CONTRACTORS

The challenges posed by Covid have complicated construction projects and presented logistical headaches for contractors with large workforces. For instance, Tom McCulley, CEO, of Anglo American Peru, revealed that the company has to do around 4,000 to 4,500 Covid tests per week at its Quellaveco operation, currently under construction in Moquegua. The industry response had been to transition, where possible, to remote operations, such as Las Bambas' recently inaugurated Digital Operations Center (DOC) in Lima.

Where does this transition leave the frontline workers and how is their role evolving? Eduardo Bennett, CEO of South American mining contractor STRACON, elaborated on how collaboration between mining companies and service providers can benefit both parties. "The capacity to load and haul materials is impossible to do remotely," he said, continuing: "This may be our role in the future of mining, and I believe that in the next few years all of the in-person mining operations will be handled by service suppliers as partners of mining companies."

Bennett mentioned that STRACON has been promoting its services in many different countries in Latin America, but has not seen any significant possibilities for major greenfield projects in the next few years. The company is therefore focused on brownfield projects, earth moving and dam construction services. Emphasizing the need for the industry to improve its process, Bennett stated: "The future of mining is related to two main aspects – technology and creativity. In my opinion, one of the challenges for the next few years will be how we can adopt and fully integrate new technologies into operations to be more efficient."

In summary, he said that it is not about how many tons of ore can be moved, but rather about how an operation can be as productive as possible.

Mining represents approximately 30% of OHL's (Obrascón Huarte Lain) total sales each year, detailed Mariela Ramones, business manager of OHL Peru. The construction company has worked on large-scale projects for Las Bambas, Quellaveco and Antamina in recent years, and believes its tunnelling



Scaffolding operators are the key component of the projects, both in terms of meeting the project calendars and in terms of being exposed to Covid. So, we had to reformulate our training program to a new five-level program, where theory-based courses are done virtually.

- Jorge Reátegui,  
General Manager,  
Layher Perú



work has given it the necessary expertise to develop underground mining projects. "OHL has developed a tunnel under the tailings dam of Antamina of approximately 2 km, and has carried out collection works on the leaks under the dam, together with all the ancillary facilities of the tunnel itself," explained Ramones.



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Image courtesy of AESA



Scaffolding specialist Layher has worked with Quellaveco, Mina Justa, Southern Copper and Toromocho on the construction phase, as well as the Talara refinery, detailed general manager Jorge Reátegui. He remarked that social distancing has restricted workforce capacity, but noted that Layher's multi-directional Allround scaffolding system has the advantage of being the lightest solution in the market, allowing for better transportation and workforce management. "We are also using lifting solutions to reduce the need for personnel. The impact of Covid has favored the introduction of these lifting systems, so clients have seen an increase in productivity," he added. Layher plans to move into new 20,000-square meter offices in Lima in 2022, as well as opening a warehouse which will triple capacity, revealed Reátegui, in addition to consolidating the company's presence in Iquitos and introducing modern construction systems in remote areas. "Our purpose

is to professionalize this segment," he concluded. Another service company in the construction space to have worked at Quellaveco and the Talara refinery is Perú Piping Spools (PPS), which specializes in fluid transmission lines, spool manufacturing, piping and engineering services. Eduardo Vera, PPS' sales manager, affirmed that both greenfield and brownfield mining projects are important for PPS: "They require new pipelines for the transportation of fluids such as water, air, fuel, pulp, and minerals." Pedro Ipince, the company's general manager, stated that PPS has managed to become the main manufacturer of spools in Peru in only five years, due to having the largest spool manufacturing plant in Latin America and focusing on technology. "PPS uses different types of software for the process of spool manufacture," he said, explaining that the technology is chosen according to client needs how it can be

incorporate into the welding processes. "For example, in order to create isometric plans in pdf, we use AutoCAD or Spoolgen." Solidifying the foundations of the mining projects worked on by contractors and construction firms requires an array of construction materials, including calcium oxide, a dry powder commonly known as quicklime (lime). Calidra, founded by Mexican investors 120 years ago, is the biggest lime manufacturer in Latin America, with an annual production of 4.5 million tonnes. Martín Barrios, Calidra's executive director, discussed the company's evolution in Peru: "We have broken two important paradigms in the Peruvian market; first, large mining companies are already considering having more than one supplier of lime as it is critical to an operation." As a second point, Barrios added that Calidra has developed an advanced logistics system that has enabled the company to supply efficiently over long distances. ■

## Eduardo Bennett

CEO  
STRACON



**What are the main themes you see currently impacting the dynamic between suppliers and mining companies?**

The future of mining is related to two main aspects – technology and creativity. OEMs such as Caterpillar, Volvo, and Komatsu are developing autonomous and remote controlled technologies for trucks and

auxiliary equipment. In my opinion, one of the challenges for the next few years will be how we can adopt and fully integrate these new technologies into operations to be more efficient. Secondly, it is about how creative mining participants can be to find new opportunities for win-win results. It is not about how many tons of ore can be moved, but rather about how an operation can be as productive as possible. The aim is to make operations as low cost and profitable for all parties involved. A few years ago, relationships were mainly contractual, but today, there is a new concept of collaboration between mining companies and suppliers.

**Considering the lack of major greenfield projects on the horizon after Quellaveco, how does a mining construction contractor grow in Peru?**

STRACON has been promoting its services in many different countries, mainly in Latam, and we have not seen any significant possibilities for major greenfield projects in the next few years. Therefore, we have been proactive and creative in developing our own capacity and expanding the company's offering for traditional mining

sites. We believe that brownfield projects will be in high demand in terms of massive earth moving and dam construction services. STRACON is also discussing the possibility of partnering with companies to develop electromechanical works, one of the essential pillars of brownfield projects.

**Do you think the adoption of mining innovation has accelerated due to the pandemic, and if so, which technologies have gained traction?**

Although the development of new technologies has been delayed due to the pandemic, the adoption of existing technologies has accelerated. We are seeing more mining companies that willing and capable of running operations remotely, such as Quebrada Blanca and Escondida in Chile. Remote operations is not only a consequence of the pandemic, but also a way in which overall safety and accuracy is being increased. On the other hand, the capacity to load and haul materials is impossible to do remotely. This may be our role in the future of mining, and I believe that in the next few years all of the in-person mining operations will be handled by service suppliers as partners of mining companies. ■

## Martín Barrios

Executive Director  
CALIDRA



**Can you introduce Calidra and explain its evolution in Peru and Latin America?**

Calidra is a lime (including calcium oxide, a dry powder commonly known as quicklime) manufacturer and solutions provider, which was founded 120 years ago by a group of Mexican investors. Today, with an annual production of 4.5 million tonnes, we are the number one lime manufacturers in Latin America. Our most important markets include Mexico, Honduras, Colombia, Argentina, Chile, and Peru, and we also plan to start activities soon in Ecuador. We entered the Peruvian market in 2012, where our initial activities involved the construction of an oven for lime fusion. Actual operations started in 2015, and since then, we have consistently delivered our products and services to the Peruvian market, specifically to the mining, construction, steel, foundry, and water treatment sectors.

Calidra is known for providing a comprehensive value offer, as apart from our product, we have an immediate response capacity and offer remarkable technical

support that has been developed throughout our 120 years of experience.

**Can you elaborate on Calidra's main mining clients and product portfolio, and explain what type of processes your products apply to?**

Calidra is currently among the top three lime producers and sellers in Peru. Our portfolio includes mainly quicklime, and we supply our products primarily in bulk. We work mostly in medium and small mining but are increasing our participation in large mining as well. In terms of large mining companies, our main strategic partners include Minsur, Chinalco, Hudbay, Buenaventura and Aruntani Group. We have broken two important paradigms in the Peruvian market; first, large mining companies are starting to request lime directly from providers. Second, we have developed an advanced logistics system in the national market that has enabled us to have a privileged position in the whole country, being able to overcome long distances. ■

# Pedro Ipince & Eduardo Vera

PI: General Manager  
EV: Sales Manager  
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PI



EV

Mining projects, both brownfield and greenfield, are extremely important for PPS, as they require new pipelines for the transportation of fluids such as water, air, fuel, pulp and minerals.

## How has PPS evolved in the last year and what is the importance of the mining sector for the company?

PI: PPS was severely affected by the pandemic; we had to interrupt our activities from March to May 2020, and re-starting them was extremely challenging. The number of workers had to be reduced from 350 to 285 and our sales levels suffered a 20% decrease in comparison with 2019. We managed to remain afloat thanks to the government's aid plans. Mining remains the most important sector for PPS and represents around 70-80% of our activities. However, our participation in the modernization project of the Talara refinery has diversified our focus.

EV: Mining projects, both brownfield and greenfield, are extremely important for PPS, as they require new pipelines for the transportation of fluids such as water, air, fuel, pulp and minerals.

## Can you give an overview of PPS's product offering?

EV: PPS offers safe, high-quality fluid transmission lines, from the point of origin to the arrival point. More specifically, we offer spool manufacturing, piping and engineering services. PPS currently has a strong focus on manufacturing products according to the technical specifications of our clients.

## Who are PPS's most recent and relevant clients in the mining sector?

PI: PPS has recently participated in a project at Quellaveco, which we carried out with Fluor's engineering from Santiago, and in the modernization project of the Talara refinery. The contract for this project was awarded to Grupo Cobra and to Graña y Montero. PPS was subcontracted by them for the manufacture of spools. Another important project has been the modification of the tailings line in Antamina, and a project with Aceros Arequipa, with IDOM's engineering.

## What technologies does the company apply for the manufacture of spools?

PI: PPS uses different types of software for the process of spool manufacture and we always search for the latest technology according to our clients'

needs and which we can incorporate in our welding processes. For example, in order to create isometric plans in pdf, we use AutoCAD or Spoolgen.

EV: PPS has developed a database to be able to control large projects, which allows us to have traceability of the materials we receive, the spools we manufacture, the person who welded each spool, etc. This way we can keep clients informed about the state of their project in a semi-automatic way, providing them with updated reports.

## How does PPS differentiate itself from its competitors?

EV: PPS is only five years old but has extensive experience and is an extremely reliable spool manufacturer. Our experience has come mainly from our work at the Talara refinery where we have worked with different thicknesses, diameters, and materials. In addition, PPS can export to countries such as Chile, which is a very competitive market. We have worked with clients such as Fluor and Ausenco with very demanding technical specifications.

PI: PPS has also been involved in the enlargement project at Cerro Verde, which has given us great expertise, and we have been involved in most piping projects across Peru to different extents. Workers at PPS also have great experience in the metal-mechanical industry. Personally, I have participated in 100% of the large projects involving the manufacture of spools in Peru since the first one in Antamina.

## What are the company's main goals and objectives for 2021-2022, and its strategy for growth?

EV: For 2021-2022, we want to consolidate ourselves in Chile, where there are five projects to be developed. We also have plans to grow in Ecuador, which is likely to become more open with the arrival of the new president, and in Colombia. PPS worked recently with Ausenco in Las Bambas, Peru, and they have been assigned a project in Mexico, so we would like to participate with them on this. In the long term, our goal is to expand progressively to the whole Latin American region and to become eventually a world-class player. ■

# Underground Contractors

## SOCIAL DISTANCING MEASURES HAVE ACCELERATED INNOVATION

■ The underground segment of the mining industry has been growing globally – a natural progression as the low hanging fruit of open-pit ore bodies depletes and miners are forced deeper. However, 2020 represented a spanner in the works for underground mining, which suffered more than its open-pit counterpart as social distancing measures meant operations took longer to ramp back up. In a confined space, and

particularly in Peru's prevalent narrow-vein underground mines, social distancing is a real challenge. On the bright side, nothing spawns innovation like necessity, and the pandemic has accelerated the development and adoption of technology in underground environments.

Gianflavio Carozzi, CEO of Peruvian underground mining contractor AESA, suggested that the willingness of mining companies to implement new technologies to achieve greater productivity is now much higher as a result of the pandemic. "The obligated migration to remote work brought down important paradigms and opened up our minds to change. This, together with safety concerns regarding a concentration of people, encouraged mining operators to reduce the personnel footprint at the mine site," he said.

Although the move to remote work for some positions started as a necessity, Carozzi suggested that mine operators are now evaluating more aggressively

the benefits that a migration of personnel out of the work front can produce by expanding productive hours in the mining cycle and increasing safety with the use of remote and/or automated equipment.

Another of Peru's main underground contractors, INCIMMET, has been expanding its business in Colombia in recent years, as well as working domestically for clients including Nexa Resources, whose Cerro Lindo operation is Peru's biggest underground mine. On the subject of innovation, Eduardo Cossio Chirinos, INCIMMET's CEO, stated that he believes the pandemic has accelerated the desire to change, but there is a big difference between willingness and an actual action plan.

"You first need a desire to invest in infrastructure before you take on the implementation of technology," said Cossio, reflecting that mining contractors need to look for a balance, because they do not own the mine or make investments into IT infrastructure for the entire mine.

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## Gianflavio Carozzi

CEO  
AESA



An important challenge will be to ensure an appropriate transition from a conventional use of equipment and staffing of operations, into a more specialized and remote and automated operation.

### To what extent has the implementation of technology at underground mine sites been accelerated by the pandemic?

The willingness to implement new technologies to achieve greater productivity is now much higher. The obligated migration to remote work brought down important paradigms and opened up our minds to change. This, together with safety concerns regarding concentration of people, encouraged mining operators to reduce personnel footprint at the mine site. The migration of some of these positions out of the mine site started as a necessity, now mine operators are evaluating more aggressively the benefits that a migration of personnel out of the work front can produce by expanding productive hours in the mining cycle and increasing safety with the use of remote and/or automated equipment.

### How does AESA prepare workers for the current business environment to ensure productivity while maintaining health and safety?

We used new virtual training tools and increased the use of diverse communications methods. We implemented more frequent, illustrative and emotional campaigns, and developed new communication channels and platforms like SMS, online video platforms and virtual reality. A detailed daily leadership routine was also key to have a closer and more effective leadership presence with our workforce.

### What potential do you see for growth in Peru as more operations transition underground?

Peru has a huge untapped potential for new projects, as well as operations that can extend mine life through exploration or by transitioning from open-pit to underground. To fulfill this potential, we need a better alignment between citizens and the political establishment in order to value and understand the importance of mining to the national economy while generating national pride about our mining know-how and performance. We also see potential in achieving synergies by servicing both underground and surface mining needs.

One very important and anticipated project is Yanacocha Sulphides, in which AESA is participating in the bidding process to

develop this project through a joint venture with Redpath Mining. In doing so, we are bringing to the table our capacity to develop projects safely in Peru and to generate economic development in the mining operators' surrounding communities, with world class operational standards, new technologies and the capability to develop large scale projects. We believe this to be an attractive platform for potential clients and hope that it will lead us to more opportunities for world class projects in the region in the years ahead.

### What would you say are the main long term challenges for underground contractors in Peru, and what could be done to mitigate or resolve them?

In the long term, I see two important challenges. One is to transition from a transactional relationship with customers into a strategic partnership that aligns both parties better to improve the management of risks and to work symbiotically in the best interest of the mine. For example, planning tends to be an area of opportunity to improve in underground mining, but when done correctly it can achieve much higher resource utilization rates and productivity.

Another important challenge will be to ensure an appropriate transition from a conventional use of equipment and staffing of operations, into a more specialized and remote and automated operation. Upskilling and reskilling of the workforce will be key, and we as contractors play a very important role in ensuring an effective implementation and proper transition.

### What do you think are main themes that will shape the underground mining industry in 2021?

Drawing a parallel to what our priorities for 2021 are, health and safety remain the number one focus. Secondly, to perform on our contracts no matter what challenging external factors we may face. Thirdly, we intend to recover the company's growth path again. Last but not least, we need to search for productivity gains for us and for our clients' benefit, which means reviewing and improving our processes, investing and adopting new tools, bringing down paradigms as it happened during the pandemic, and developing the communities within the area of influence in which we operate. ■

With that in mind, he explained how INCIMMET's innovation strategy is focused on the short and medium term needs of its clients, without neglecting the big trends in the long term. Justifying this strategy, INCIMMET believes this is how tangible and realistic progress can be made at a mining operation.

Paul Murphy, manager of the South American region for Mining Plus, echoed the sentiment that Covid has accelerated the adoption of technology at underground mine sites: "Situations where companies are forced to embrace certain technologies, such as during this pandemic, are often the catalysts to show first-hand that there are different, and often better ways of doing business."

Elaborating, Murphy added: "For example, one of the benefits of automation is to keep people out of harm's way preventing physical injury, but more recently a primary driver for automation has been to reduce the number of people in certain environments."

Mining Plus's parent company, Australian underground mining contractor Byrnescut, is targeting growth in the Americas after establishing its reputation as a leading contract miner for large-scale underground projects in Australia and Africa, according to Greg Jackson, managing director of Byrnescut Offshore.

The company has a partnership with Peruvian contractor, San Martín, in preparation for the transition to larger underground operations that is taking place in South America. The poster child for such projects in Latam is Codelco's Chuquicamata, which started underground operations in 2019 to exploit the remaining resources located below the current ore deposit until 2058.

The majority of Peru's iconic mines in recent years have been open-pit operations, such as Antamina, Las Bambas, Cerro Verde and Toquepala. Underground mining still represents a large portion of production in Peru, but that generally comes from medium-sized operations such as El Brocal, Cerro Lindo and Condestable.

Mining methods that drive down costs and allow for bulk mining lower grade material, such as large open stopes, sub



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## Eduardo Cossio Chirinos

CEO  
INCIMMET

Long term relationships are not only key for profitability in the point of view of the mining contractor, but also for clients, as it takes some time to fully learn how each mine can be optimized.

### Can you elaborate on INCIMMET's experience in mine backfill?

We are trying to create valuable content demonstrating INCIMMET's extensive experience in the mine backfill field, as a part of our integral solution value proposition. We have provided EPCM services for mine backfills since the very early stages of the company, providing not only the operation of the backfill, but also the engineering and construction of the plants. A good mine backfill system accelerates production, which is particularly advantageous considering today's metal prices. Importantly, you cannot achieve optimal productivity at a mine if you do not have a proper mine backfill system, and INCIMMET can help companies identify the best solutions for their challenges and tailor this to the specificities of their mine.

### What are some of the standout projects INCIMMET has worked on in Colombia and Peru?

INCIMMET's most recent contract is with La Paz Emerald mine owned by Fura Gems in Colombia. Thus far, it has been a very interesting experience with several challenges, as gemstones are different to precious or base metals, and it requires a change of mindset about how to mine. This project has motivated us to broaden the scope of projects we take on. We are also involved in vertical development operations for Continental Gold's Buriticá mine in Colombia, constructing shafts for ore and waste passes.

In Peru, INCIMMET is the only contractor working on the Orcopampa and Tambomayo projects for Buenaventura, where we provide integral solutions such as mine development, mine backfill, rock support and ore production. Nexa Resources' Cerro Lindo, the biggest underground mine in Peru, is also one of the standout projects INCIMMET has been working on for several years. We are also doing long haul drilling for Nexa. Additionally, we have been conducting an engineering project for Cori Puno, a gold mining company in Peru that also has an operation in Colombia.

### Do you think the implementation of new technologies at mine sites has been accelerated because of the pandemic?

You first need a desire to invest in infrastructure before you take on the implementation of technology. As a mining contractor we need to look for the balance, because we do not own the mine or make investments into IT infrastructure for the entire mine. The pandemic accelerated the willingness to adopt, but that does not mean that you will reach industry 4.0 in 2021. INCIMMET's innovation strategy is focused on the short and medium term of our client needs, without neglecting the big trends in the long term. We believe this is how tangible and realistic progress can be made at a mining operation.

### As a contractor, how do you maintain safety standards whilst working across different mining environments for different clients?

For many years INCIMMET has been reinforcing its safety systems and philosophy, while adapting to the specific needs of clients. However, since we began working with DuPont, we changed our mindset to start working with one standard. Even though we thought that we were already one of the best contractors regarding safety, we found significant space for improvement, and with the efforts we have put in over the past three years we have been able to reduce injuries by 98%. Moreover, in May 2021, we won a prize in an international contest for best practices in safety by ISEM.

### What would you say are the benefits of maintaining long term relationships between contractors and mining companies?

Long term relationships are not only key for profitability in the point of view of the mining contractor, but also for clients, as it takes some time to fully learn how each mine can be optimized and for the efforts that you put in to show results. Contractors are anonymous in the quarterly production results of mining companies, but at least 50% to 60% of the success in the production relies on the contractor. We are in a very complex business and without long term relationships, we cannot be sustainable. Contractors such as INCIMMET have a lot of knowledge and experience to provide to clients, and through collaboration we can all achieve success. ■

level caves and block caves, are Byrnes-cut's specialty, and Jackson elaborated on the type of opportunities he sees in the Americas: "Yanacocha in Peru, transitioning from oxides at surface to sulfides underground, or Newcrest's Red Chris in Canada, which could be a large block cave, are examples of the type of deposits that lend themselves to bulk mining methods."

The planned construction of the Newmont-operated US\$2 billion Yanacocha Sulfides project marks the start of underground mining on a greater scale in Peru. However, the news that the construction decision had been delayed, in part because of political uncertainty, is a blow to the industry.

This also raises the question of how the underground industry could grow under a Castillo government? On one hand, mining companies and banks may be reluctant to invest in large-capex projects, depending on whether anti-mining rhetoric results in meaningful changes. On the other hand, small and medium-sized underground operations, which have been Peru's bread and butter, generally involve less environmental impact than larger open-pit projects. While it is still too early to tell how the following months and years will play out, companies which focus on improvements through the use of technology can at least guarantee to maximize productivity from their current operations.

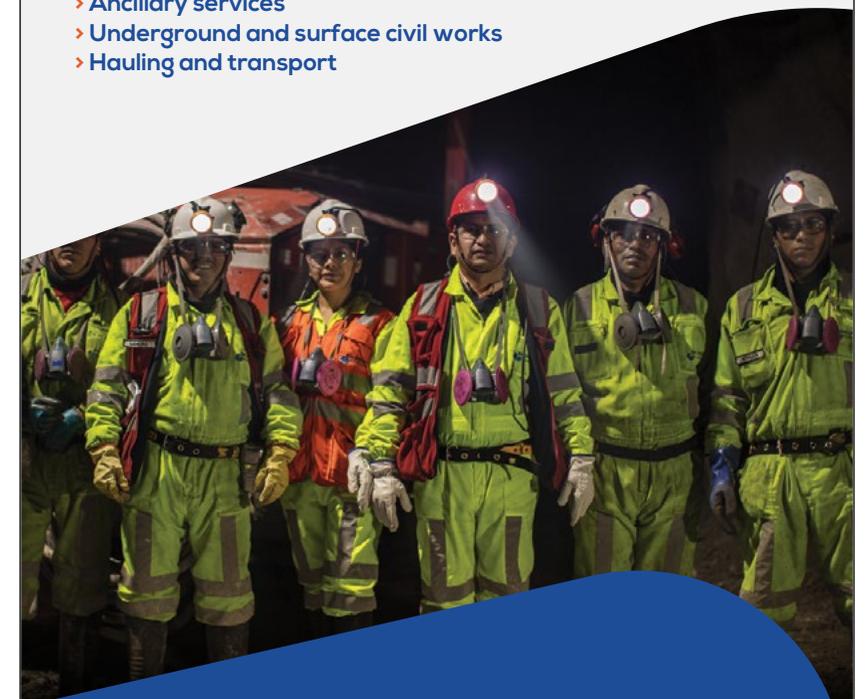
In the quest for greater productivity, Wilder Ruiz Conejo, general manager of JRC Ingeniería y Construcción, spoke of the work JRC has done with Buenaventura's innovation department: "In addition to remote control equipment, we have been working to incorporate multipurpose equipment with which we can carry out up to three activities almost simultaneously, ostensibly reducing the exposure of our workers and allowing us to cover key positions in any project where we currently have difficulties due to the pandemic."

JRC has undergone a process of expansion and internationalization since 2019, when it entered the Mexican market with Fresnillo PLC, related Conejo, and is now looking at opportunities in countries such as Colombia, Ecuador and India to continue its growth. ■

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INCIMMET



## Greg Jackson

Managing Director  
BYRNECUT OFFSHORE

**When we last spoke at PDAC 2020, Byrnegut was looking to diversify from its strongholds in Australia and Africa by making inroads into the Americas. Can you comment on the progress made?**

We are participating in an active tender in Peru for a large underground project due to move into construction by the end of 2021. Byrnegut is still active with San Martín, our partner in Peru, looking at other opportunities in South America, particularly in Peru, Ecuador and Colombia, including a project for Nexa Resources.

In North America, we have shifted our near-term focus from the US to Canada, as a number of tender processes in the US were delayed due to Covid. Byrnegut is involved in the tender process for Newcrest's Red Chris mine in British Columbia, and we recently picked up a job for Evolution Mining at its Red Lake mine in Ontario. We are mobilizing a small team to undertake a development improvement project at Red Lake, and if successful, this will be rolled out further into an underground exploration decline. We are also in conversation with Newmont regarding a similar project at its Musselwhite mine.

**Why do you think the Australian industry currently has such a strong reputation for underground mining contractors?**

Economic forces drove the industry in Australia to move from the owner/miner model to the contract mining model earlier than the Americas, and it became the norm. This led to a greater focus on innovation in Australia, that perhaps the traditional, multi-generational mining community in the Americas were more reluctant to embrace.

**In 2020, Byrnegut became the first company to trial tele-remote operation of Sandvik's development drills at OZ Minerals' Prominent Hill mine. Which technologies have advanced during the pandemic?**

Improving efficiency to make use of the 24 hour day was a trend before the pandemic, to make up for the time lost during shift changes. Our work with Sandvik at OZ Minerals' Prominent Hill mine is an example of this. Some of the

technologies that have advanced during the pandemic include looking at fault find on equipment, and doing remote technical installations where the expert cannot be brought in from outside. I think mining will always require a certain level of face to face interaction, particularly for new projects and new clients, but if high-level expertise can be given remotely to solve technical issues at mine sites it will make a big difference from a productivity and efficiency standpoint.

**To what extent has the pandemic impacted your business as an international contractor with a large workforce?**

It has meant a lot of work, especially from an administration perspective. We have really appreciated the support of our workforce, having to work longer rotations, and in some cases not being able to leave the country they were working in for up to four months. We have had to adjust their work rosters on site to give them more time off while at the camp. This situation has also created more opportunities for Byrnegut's local workforces, and our focus on expats training local capacity over the years has paid off. During the pandemic we have also utilized the reach of the Byrnegut Group, in particular Mining Plus, leveraging their people on the ground in regions such as North and South America.

**Considering current metals prices and the outlook for commodities, do you expect more bulk mining projects with large tonnage to get the green light in the coming years?**

Absolutely, and that is why we are so excited about opportunities in the Americas in the coming years. This is Byrnegut's specialty – large-scale mining methods that drive down costs and allow for bulk mining lower grade material, such as large open stopes, sub level caves and block caves. Projects such as Yanacocha in Peru, transitioning from oxides at surface to sulfides underground, or Newcrest's Red Chris in Canada, which could be a large block cave, are examples of the type of deposits that lend themselves to bulk mining methods. ■

Byrnegut is still active with San Martín, our partner in Peru, looking at other opportunities in South America, particularly in Peru, Ecuador and Colombia, including a project for Nexa Resources.

## Wilder Ruiz Conejo



General Manager  
JRC INGENIERÍA Y CONSTRUCCIÓN

**How has JRC Engineering and Construction (JRC) evolved in recent years and why did you decide to change the brand in 2021?**

We have evolved a lot and have applied our own experiences to the market. After working on several underground mining projects since 2000, in 2010 we were presented with a great challenge when Sociedad Minera El Brocal, for whom we had been carrying out underground excavation work since 2006, entrusted us with the responsibility of operating the Colquijirca mine comprehensively. This was the beginning of our current business model. Today, we are in charge of four comprehensive operations, among other projects. One of the main pillars in our company are people. Therefore, our approach is focused on human management, so that employees feel valued and part of a great family that turns 21 years old this year (2021).

In 2019, we entered the Mexican market, where we currently have two projects. That same year, we were awarded, for the first time, an open-pit project. This meant the expansion of our business areas and the beginning of our international expansion. All this has strengthened our company and now we want to project JRC as a global and dynamic brand, taking into account our experience and value in the execution of comprehensive underground mines.

**Who are JRC's main clients and what standout underground projects have you worked on?**

Among our main operations, we are currently working with Quenuales, from the Glencore Group, both in underground and surface mining activities. We are also present in El Brocal and Chacua with Buenaventura, in Trevali Mining's Santander mine and in Ticlio, for Volcan. Together with our clients, we have been facing the challenges generated by the pandemic.

In most of our underground operations, we cover all services, including the extraction and hauling of the material to the processing plant. We will look out for opportunities that may arise for us in the short and medium term, as experts in the integral execution of underground mines and massive mining methods.

**How has your experience been in the international market?**

We managed to enter Mexico in 2019 and despite the arrival of the pandemic, this process did not stop. In a joint effort with the mining company Fresnillo PLC, we did our best to take care of our people. This first expansion allowed us to position ourselves in international markets and gave us the opportunity to look at new opportunities in other markets such as Colombia, Ecuador, and India, which are very attractive countries for the mining sector.

**How has the company coped with the impact of the pandemic?**

Like all Peruvian companies, we experienced many inconveniences to which, together with our clients, we had to give an immediate response. However, when a mining project stops, it is not possible to resume actions normally, but rather, it is necessary to restart almost from scratch, and this exacerbates the situation. In addition, we were affected by infections, which had an impact on our work teams. Between September and October of the same year, we operated at 90% of our capacity. Currently, although we are already working at 100%, the pandemic continues to be a daily challenge that we must face in the best way to always take care of our people.

**What new technologies have you been working with recently?**

We work closely with Buenaventura's innovation department, one of our main clients, jointly seeking to incorporate autonomous teams, among other improvement actions. In addition to remote control equipment, with which we have already worked for several years, we have been working to incorporate multipurpose equipment with which we can carry out up to three activities almost simultaneously, ostensibly reducing the exposure of our workers and allowing us to cover key positions in any project where we currently have difficulties due to the pandemic. ■

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# Raise Boring and Shotcrete Specialists

MECHANIZATION IS INCREASING SAFETY AND REDUCING WASTE

The amount of small to medium-sized underground mines in Peru has created a sub-segment in the industry where companies active in Peru have established a leading position in the development of machinery and services for narrow-vein operations. Traditionally, raise boring's purpose is for ventilation of the exhaust of diesel-driven equipment within mines. However, Tumi Raise Boring has developed the raise boring process to put it into the production field, initially because Nexa Resources needed it for slot raising, according to general manager, Marc Blattner.

"We designed and have a patent on a semi-automated raise boring machine called the SMB 400 SR, and a bigger model called the SBM 700 SR. The slot raise (burn holes) that mines use for production are now being done by raise boring machines, which allows for less explosives and therefore less waste," detailed Blattner, who noted that this brings down the cost, improves efficiency and set up time, and makes human contact as minimal as possible. "This renders diamond drilling and all other forms slot arising inferior to the SBM-400SR system," he added. In recent years, Robocon has become a more vertically integrated business to provide a full range of services related to shotcrete, including technology such as slick lines – a piping system that helps transport concrete within a mine. On the topic of innovation, Enrique Sattler, Robocon's CEO, spoke of how the introduction of laser technology has been an important focus for Robocon: "We specialize in the operation of small machinery and laser technology is an excellent complement to this. Wet shotcrete

technology offers considerable benefits in terms of safety and speed, regardless of the operation's size. In robotics-led operations, risk is minimized and efficiency is increased."

Sattler explained that the speed of processes is key, especially for mines that rely on small tunnels, because it can contribute directly to profitability. "Laser technology also optimizes operations because it determines the best processes for a given volume and area and helps verify the correct width of drilling," he added.

For Master Drilling, the South African multinational, raise boring equipment and support services account for all of its business in Peru, according to Belisario Tijero, general manager. The company is a pioneer of horizontal raise boring (HRB) technology, developed to replace drill and blast activities, which can be dangerous. "HRB technology is used to create horizontal excavation between two existing tunnels in an underground mine. It is mostly used for ventilation shafts from the surface to underground, but also assists in providing access for personnel or material underground," explained Tijero.

He added that, compared to conventional methods of excavation, HRB is safer, quicker, there are no explosives used, no rock fractures associated with blasting allowing more accurate excavation, the operation is autonomous, and the solution is more cost-effective.

Tijero pointed to the trend of mines moving deeper underground that requires raise bore drilling machines that can drill deeper, faster and more accurately. "To ensure that rod handling is easy and quick with the minimum human intervention to reduce risk, all our machines are automated (with pipe handlers & feeders) and a control panel provides readings to the operator," he added.

Montali S.A., the international raise mining and shaft sinking contractor, works with the likes of Buenaventura, Poderosa, Sierra Metals and Hochtief Mining in Peru. Yran Ludena Santana, Montali's general manager, detailed the company's wide range of underground services in Latin America, which include ground control, underground construction, infrastructure development and underground rehabilitation. "We are specialized in excavating raise climber chimneys using Alimak equipment," said Santana. ■

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# Belisario Tijero



General Manager – Peru  
**MASTER DRILLING**

The market still sees Master Drilling as a drilling company, but these days we are really a technology company.

**What is Master Drilling's current footprint worldwide, and how significant is the Peruvian market for the company?**

Master Drilling has a presence in more than 19 countries, with 26 offices worldwide. The Peruvian market is extremely important to us. From our Peruvian offices we are also managing Ecuador, Colombia, and Guatemala, with Brazil, Mexico and Chile having their own offices and general managers. We pride ourselves on tailoring solutions to meet the specific conditions and geographical challenges faced by our clients.

**Who are Master Drilling's main clients in Peru in 2021?**

Our client portfolio contains the main mining companies in Peru. Our current active clients include Volcan, where we have worked at their Chungar, Andaychagua and San Cristobal mines. We also provide services to Sierra Metals' Yauricocha mine, Minera Bateas' Caylloma mine in Arequipa, Trafigura's Catalina Huanca mine, and the Casapalca mine in center of Peru. We have been involved in different projects with Buenaventura and we are currently in operation at their Uchucchacua project. We are developing Hochtief Mining's Inmaculada mine.

At the moment, raise boring equipment and support services account for all of our business in Peru, but the company is expanding from Peru with exploration drilling services.

**Master Drilling is a pioneer of horizontal raise boring (HRB) technology. Can you elaborate on how HRB differs to traditional raise boring, and what type of operations it suits?**

Master Drilling's HRB solution was developed to replace drill and blast activities, which are aggressive and can be harmful. HRB technology is used to create horizontal excavation between two existing tunnels in an underground mine. It is mostly used for ventilation shafts from the surface to underground, but also assists in providing access for personnel or material underground. Compared to conventional methods of excavation, HRB is safer, quicker, there are no explosives used, no rock fractures associated with blasting, you get more accurate excavation, the operation is autonomous, and the solution is more cost-effective.

The general trend is that mines are getting deeper and are

venturing into more uncharted territories. Therefore, raise bore drilling machines must be able to drill deeper, faster and more accurately. To ensure that rod handling is easy and quick with the minimum human intervention to reduce risk, all our machines are automated (with pipe handlers & feeders) and a control panel provide readings to the operator.

**In March 2021, Master Drilling announced a 40% investment in data-driven mine management solution company, AVA Solutions. What were the reasons behind this transaction?**

The market still sees Master Drilling as a drilling company, but these days we are really a technology company. We are innovating and focused on delivering top quality services at the most competitive costs. The AVA acquisition is aligned with the idea is to change the company's profile from being seen as a drilling company to now being seen as a technology provider. We are continuously looking for new technology solutions that make sense to our business and are for the benefit of our customers. AVA has excellent fleet management solutions that are easy to install, cheap and fast.

**In terms of challenges and opportunities, how would you compare Peru to other mining jurisdictions?**

In terms of our specific market, there is increasing local competition that drives us to take another look at our strategy. This is one of the reasons why Master Drilling wants to be perceived as a technology provider that offers innovative solutions to the market. We want to challenge the status quo to provide our clients with specialized, adaptive, one-stop drilling solutions.

**Why do you think Master Drilling's method of working adds value to mining clients?**

We service our clients by conceptualizing, developing and delivering the equipment they need, with a firm focus on ongoing support and continuous portfolio innovation. This starts with the design and manufacturing of our products, and extends to training, high operating quality and continued maintenance. We provide operational support and complete project management for all our drill rigs. ■

## Enrique Sattler

CEO  
ROBOCON



The impetus of the market has been favorable and we have been able to produce positive results despite challenges to supply chains and temporary closures.

### How was 2020 for Robocon?

2020 was a challenging year, as was the case for many businesses in Peru, because we had to pause operations for three months due to the enforced lockdown. We had to implement new protocols such as working from home and stricter sanitary measures; but fortunately today (February 2021), we have returned to pre-pandemic production rates. We noticed demand increases in Q4 2020 related to base and precious metals price increases and our clients' needs to ramp up production. In a context of uncertainty, the companies with the strongest backbones are able to surpass difficult times and come out stronger.

### What are some of the main projects Robocon has worked on in the last two years?

The projects Robocon participates in tend to have long timeframes: we retain the majority of our partners and focus on recurring business for key clients including Pan American Silver and Buenaventura. The impetus of the market has been favorable and we have been able to produce positive results despite challenges to supply chains and temporary closures. For example, maintenance of equipment has been particularly difficult due to issues sourcing parts. However, the mechanization of shotcrete in small tunnels, merging from dry to wet shotcrete, remains in high demand as a service working with the mine or integrated with a contractor.

At Pan American Silver's Huarón and Moroccan mines we are utilizing robotics for tunnel construction. Projects such as these require large investments; for example, the manufacturing of equipment and testing. For that reason, we have faced some challenges related to health protocol procedures and closures. However, we are striving to move ahead and 2021 has started on a positive note.

### Can you explain the benefits of some of the new innovations in the shotcrete market, including laser technology?

Introduction of laser technology has been an important focus for Robocon. We specialize in the operation of small machinery and laser technology is an excellent complement to this. Wet shotcrete technology offers considerable benefits in terms of safety and speed, regardless of the operation's size. In robotics-led operations, risk is minimized and efficiency is increased. Speed of processes is key, especially for mines that rely on

small tunnels, because it can contribute directly to profitability. Laser technology also optimizes operations because it determines the best processes for a given volume and area; it also helps verify the correct width of drilling.

### How is Robocon becoming a more vertically integrated business to better serve clients?

We offer the provision of all the services related to shotcrete. For example, transporting the materials, implementation, construction and maintenance. This allows us to have a bigger impact. We also partner with other service providers to insure our partners have a seamless experience. Finally, Robocon offers services of training for operators – we extend the standards of quality that characterize our workers to third parties. We want to become a point of reference for shotcrete in Latin America.

An important area where we collaborate with clients is in the monitoring of tunnels, as well as in material consulting. Robocon offers pre-manufactured equipment and maintenance services.

### Which jurisdictions outside of Peru do you see as having high potential for growth?

Mexico, Colombia and Chile are three markets we are focused on. Bolivia has interesting geological potential, however, due to the political context it is now more challenging. For Robocon, business development is determined by where our clients choose to take us. For example, Pan American Silver wants us to work in their Mexican operations, and long-term relationships with international mining companies will lead to opportunities further afield.

### What are Robocon's main objectives for the next 12 months?

Service provision is a business of slim margins therefore closures can have a drastic impact on our balance sheet. Risk is very high and our aim is to minimize the possibility of business interruptions by ensuring we accommodate very thoroughly to health protocols and continue to provide the best quality service to our clients. We want to execute the contracts negotiated last year; equipment maintenance and the manufacturing of new equipment will be two key areas. ■

## Yrán Ludeña Santana

General Manager  
MONTALI PERU



### What are Montali's main mining services, including raise boring and shaft sinking?

Montali offers a wide range of underground services in Latin America which include ground control, raise boring, shaft sinking, underground construction, infrastructure development, and underground rehabilitation. We are also specialized in excavating raise climber chimneys using Alimak equipment. We are a unique partner for the mining industry. We pride ourselves on being resilient, responsible, bringing excellent solutions and services to our clients.

### Considering the current context where in-person interaction is complicated, how are you staying close to clients?

The pandemic has accelerated the use of technologies, such as digital and electrical tools, which Montali is very familiar working with, even before the pandemic. We are always looking to bringing the most efficient solutions to every challenge we face and this time was no different. The pandemic has provided the opportunity for increasing the adoption of remote-working and digital communication tools, what ended up increasing communication with our clients. Now, working remotely has actually increased communication as there are now more virtual meetings between us and the clients than there would have been in person. Digitization technologies are increasing productivity by fostering a closer relationship between service provider and customer through virtual communication platforms.

### To what extent do you think political instability in Peru could affect the country's mining industry?

Politics plays a major role in the mining industry, especially with regards to attracting international investment. We still believe that Peru is a great country capable of thriving despite facing difficult times due to the uncertainty the political situation brings. Peru is extremely rich in mineral resources, has an educated workforce, and has strong institutions doing good work regardless of political turbulence, which is not new in the country. We need to continue working towards offering stability to attract global investors to the mining industry, which will contribute to the growth of the economy.

### What opportunities do you see in Peru's mining industry in the coming years?

There are strong countries with extremely rich resources which

are underexplored, one of them is Peru. This brings the certainty that there will be a lot of work to do within the mining industry for many years to come. Peru has reserves for the next 30 to 50 years, which represent a very attractive opportunities for both national and international companies to provide their knowledge and implement technologies that are not yet being used in the region. The mining industry is evolving significantly fast which brings certainty of growth opportunities and work stability.

### Can you elaborate on Montali's commitment to social responsibility and the main initiatives you have regarding local communities?

Being a Peruvian company with experience in many places in Latin America, we want to bring the best to our communities in the region. We have developed different models of education for both the communities that we are involved in, as well as in our own workforce. We also hire our employees from the communities to involve them in our operations and empower them to develop knowledge and become technical specialists. This allows them to earn salaries which enable them to provide a quality life for their families and further educate the younger generation. Education and developing know-how within the mining industry is very important for the future of the industry. As a mining contractor, Montali is moving in a direction where we can provide the most value for our clients, our suppliers, our employees and especially our communities. ■

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# EQUIPMENT & TECHNOLOGY

"Autonomy brings numerous benefits, such as a faster production cycle, as we can increase speed in a safer environment and maximize the trucks' utilization. Also, the performance of the trucks is optimized"

- Gonzalo Díaz Pró,  
General Manager,  
Ferreyros S.A.



# OEMs Focus on Productivity

DEMAND HAS BEEN ABUNDANT IN 2021, BUT A LACK OF GREENFIELD PROJECTS RAISES CONCERN

The market for mining trucks is a good barometer of the health of the industry. A fundamental component in the extraction and movement of ore, OEMs have been making hay while the sun is shining in 2021. The perfect storm of pent-up demand combined with all-time-high copper prices saw Caterpillar's (NYSE: CAT) share price more than double from June 2020 to June 2021, as the company surpassed a staggering US\$130 billion market cap. At the annual Alliance Bernstein Strategic Decisions Conference on June 2nd, Caterpillar's CEO, Jim Umpleby, mentioned that he sees "a very long and healthy cycle" in mining, driven by the energy transition.



Metals involved in the energy transition, most notably copper, represent an enormous opportunity for OEMs in Peru. This is exemplified by Caterpillar's Peruvian distributor, Ferreyros, which won multi-million dollar contracts to provide equipment for the two standout copper projects in Peru's recent development pipeline; Mina Justa and Quellaveco. As of June 2021, Ferreyros had sold 27 trucks to Anglo American for Quellaveco, of which 16 units are already on site, revealed Gonzalo Díaz Pró, Ferreyros' general manager. Eight of these trucks are currently operating autonomously, with no driver, with four running manually, and the rest being assembled and prepared for autonomy. However, the companies expect that after a year of operation, all 27 trucks will run autonomously.

When the trucks are fully operational, there will be numerous benefits. Díaz Pró elaborated: "a faster production cycle, as we can increase speed in a safer environment and maximize the trucks' utilization. Also, the performance of the trucks is optimized." He added that worldwide experiences with Cat autonomy have shown results of 20% to 30% improvement in productivity, and considering the scale of the operation, Díaz Pró stated that Quellaveco will be at the vanguard of large-scale autonomous mining in the Americas.

Tomás Martínez, CEO of Komatsu-Mitsui Maquinarias Del Peru (KMMP), revealed that the company exceeded its sales target by 15% in Q1 2021, a trend that has continued in Q2. Acknowledging that there were concerns from clients about the election result, Martínez affirmed that the mood remained optimistic: "Although unfortunately there is not much perspective for greenfield investment in the short-term, we hope to see sustained brownfield investment and exploration investment considering the outlook for copper."

On the subject of technology, Martínez remarked that KMMP's main focus has been to maximize the reliability and productivity of its haulage fleets. He highlighted a range of solutions including remote assistance and remote conditioning monitoring, which permit the digital maintenance management of the fleet and increase uptime. "KOMTRAX is Komatsu's remote monitoring system that lets you monitor all the essential information about your Komatsu equipment directly on your computer. Immersive Technologies kits (simulators for operators training) and Komvision help increase safety and productivity, allowing the operator to have 360 degree vision and prevent collisions."

Image courtesy of Anglo American

2021 is a landmark year for KMMP, marking the company's 25th anniversary in Peru and Komatsu's 100th anniversary, while its subsidiary, Cummins, celebrates 10 years in Peru. Erick Ruiz, director of the mining division at Cummins Peru, explained how the QSK 78 engines the company supplies have evolved in recent years: "The biggest difference between the earlier QSK78 version and the new MCRS technology is the engine's fuel injection, which generates more efficiency and provides additional cost savings for our customers (5%+ in terms of fuel consumption)." Frank Lazo, Cummins' general manager in Peru, elaborated on some of the new technology the company has been utilizing: "Preventech, a remote monitoring technology, allows our operations team to continuously monitor Cummins engines and ensure levels of productivity." Lazo also gave the example of Cummins digital communication kit, currently under development locally in Peru, which provides real time video, images and audio from the technicians perspective to the end user.

While mines such as Quellaveco can be seen as emblematic of the direction the industry is headed, the reality for most Peruvian mines is that diesel-powered equipment currently offers a more cost-effective option, and still represents the majority of vehicles. However, the transition to electric vehicles is being made through hybrid equipment. Giorgio Mosoni, general manager of John Deere and Wirtgen Group distributor, Ipesa, outlined the range of hybrid equipment his company offers, including loaders and excavators with technology that allows the recharging of batteries during braking or rotation motions.

In 2020, Ipesa expanded its heavy mining machinery fleet from one to three machines in Peru, including two 90-ton Hitachi 870 machines for the Shougang iron-ore mine south of Lima, and a third machine to a gold project in Cajamarca. Mosoni also highlighted the company's focus on innovation for non-traditional equipment for the transportation of materials: "For example, Ipesa has a Japanese all-terrain machine called Morooka, a rubber track vehicle that allows for greater flotation which works in tin-mines for Minsur." ■



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## Gonzalo Díaz Pró

General Manager  
FERREYROS S.A.



Ferreyros and Caterpillar are proud of being the first in deploying autonomous trucks in the country. Peru is in the awakening of a new era in mining.

### To what extent have you seen demand for mining equipment evolve in the last 12 months?

The second half of 2020 was positive, with each month from July better than the previous one. 2021 has continued this trend, with mining companies looking to produce as much as they can, and the industry has become accustomed to working safely and efficiently around Covid. Our shops today (June 2021) are almost full and some of them are running double shifts because customers are pushing for more, which is partly a result of the high copper price. In 2020, Ferreyros made a large investment in its parts depot in Lima, rebuilding the facility to give us 40% more capacity. This was completed early this year, and has enabled growth through faster cycles and more storage. Investments such as this are long term and characteristic of the way Ferreyros has operated as the company approaches its 100 year anniversary in 2022.

### How will the Cat 794 AC 320-tonne trucks at Quellaveco benefit the operation in the long term?

Ferreyros has sold 27 trucks to Anglo American for Quellaveco, of which 16 units are already on site. Eight of these trucks are currently operating autonomously, with no driver, with other four running manually, and the rest being assembled and prepared for autonomy. At the moment, both autonomous and manned trucks are operating at the mine site, but we expect that next year,

all 27 trucks will run autonomously. Quellaveco will be at the vanguard of large-scale autonomous mining in the Americas. Ferreyros and Caterpillar are proud of being the first in deploying autonomous trucks in the country. Peru is in the awakening of a new era in mining.

Autonomy brings numerous benefits, such as a faster production cycle, as we can increase speed in a safer environment and maximize the trucks' utilization. Also, the performance of the trucks is optimized. Worldwide experiences with Cat autonomy had shown results of 20% to 30% improvement in productivity.

### Can you tell us about Cat Command hauling technology from Caterpillar's MineStar platform, and explain how this allows mining companies to adopt autonomy?

The backbone of Caterpillar's autonomous solutions is the MineStar suite, which was introduced to Ferreyros' portfolio more than 10 years ago. Originally this was designed to obtain data from equipment to analyze how the machines are performing, and then evolved to include a fleet management system and high-precision technologies. Therefore, we now have a comprehensive technology portfolio, which includes Cat Command. This allows us to control the machine, and importantly it is OEM agnostic, valid for Cat units and other brands. It started with the Cat 793 truck, a mechanical drive vehi-

cle used in Australia, and has also been introduced to the electrical 794 trucks seen at projects such as Quellaveco and Quebrada Blanca. Today, almost 400 trucks are operating with Cat Command globally, which is a result of customers committed to boosting their productivity through automated operations. Cat trucks running in Peru, including units with a 400-ton payload, can be converted to autonomous vehicles. I'd also like to highlight that we are in the process of implementing autonomy in underground mining in Peru, with a R1700 LHD unit, using Cat Command technology.

### Ferreyros is a large employer and collaborates in many mining projects. In your opinion, how important is the economic ecosystem that mining creates in Peru?

We support the mining industry as a key driver for improving the welfare of Peruvians. By taking advantage of the richness beneath our feet and inside our mountains in an environmentally-friendly way and by paying taxes, we can generate wealth which benefits many people directly and indirectly. For one person working at a mine, there are eight who produce goods or services around them. Mining represents 60% of Peru's total exports. Mining companies also promote the best practices in terms of sustainability, safety and productivity, and we as solutions partners accompany them in their goals. ■

## Giorgio Mosoni

Co-CEO  
IPESA



With over 17,000 square meters for parts and equipment, our logistics center has tripled IPESA's spare-parts availability and has centralized our machine dispatch.

### How was performance impacted by the pandemic in 2020?

Overall, 2020 ended up being a great year for IPESA, which, considering the conditions, was surprising even to us. As we moved out of the lockdown in July and August, the recovery was much faster than expected, and we ended up growing 15% in 2020 in comparison to 2019. During the pandemic, the agricultural sector was one of the few sectors that was allowed to continue operating. Since our company is not only a machine provider but also a service provider for this sector, we were able to continue operations on a limited basis throughout the pandemic, providing services and parts to essential sectors in Peru.

At the end of the first lockdown, government and private investment had a quick turnaround, so we saw an important increase in machine spending in the second half of the year. Business results accelerated going into Q4, and 2021 has started on the same trajectory. Despite the tragedy, the pandemic has allowed us to solidify business relationships with our most important clients.

### Which of the mining equipment IPESA distributes has been in high demand in recent months?

IPESA started expanding its mining services in 2020. In terms of heavy machinery, we tripled our presence by adding two 85-ton Hitachi ZX-870 excavators. These are currently working in Shougang's Marcona iron-ore mine south of Lima, and in gold mines in Cajamarca. This is an important footprint expan-

sion for the company, because our focus within mining has traditionally been with support equipment; mostly material movement during the pre-construction phase of the mine as well as general road maintenance. Additionally, we have focused on innovation and non-traditional equipment for the transportation of materials. For example, IPESA commercializes Morooka equipment, a Japanese rubber track carrier that allows for greater flotation. These machines are currently working in the San Rafael tin mine with Minsur. Finally, Wirtgen surface miners continue to revolutionize traditional mining as they avoid the blasting step in the mining process.

### How is IPESA participating in the transition from diesel machines to hybrid and electric equipment?

There is a desire to move towards electric equipment, but Peru is slightly behind because of the greater cost that this technology demands at the moment. In mining and construction, IPESA has a variety of hybrid equipment; specifically, John Deere front loaders and excavators. On the Wirtgen Group side, our Kleemann equipment (crushers) come with electric generators and engines in conjunction with the traditional diesel engine.

### IPESA's new logistics center in Lima was inaugurated in September, 2019. What extra capacity does this give the company, and how does this benefit clients?

With over 17,000 square meters for parts and equipment, our logistics

center has tripled IPESA's spare-parts availability and has centralized our machine dispatch. It has reduced delivery time from the moment of purchase by about 40%, and doubled our machine warehousing capacity. The reduced lead times and greater inventory capacity has greatly benefited our clients.

### Why do you think the integration of agriculture and mining is important?

The greatest challenge the mining industry faces in Peru is its relationship with local communities. The country is traditionally suspicious of large foreign corporations and governments, so rather than leaving the integration process up to the authorities, the burden is on private companies to bridge this divide. At IPESA, we have always worked closely with local communities, and provide them with training so they understand the benefits of potential added business when it comes to mining operations.

### Moving forward, what is IPESA's strategy for growth in the mining industry?

The mining sector is currently dominated by a handful of equipment providers, and we do not believe that this is in the best interest of mining companies or the local communities. Our goal is to consolidate IPESA as a viable and more productive alternative to these legacy providers, by demonstrating the value-add of our machinery, our world class service, and continuing to work closely with local communities. ■

## Tomás Martínez

CEO  
KOMATSU-MITSUI  
MAQUINARIAS DEL PERU



### As operations reopened, how did the performance of KMMP improve in Q4 2020 and Q1 2021?

The reopening of mining activities ramped up in the second half of 2020, without reach pre-pandemic levels. Q4 represented a strong rebound in the areas of construction and machinery rentals, and KMMP agreed a number of contracts with mining companies, meaning we finished a challenging year strongly. In Q1 2021 we finished 15% above our sales target, and this upward trajectory has continued into Q2. Although there is concern from our clients about the impact of the election, there are still positivity in the industry stemming from the high metals prices, particularly copper.

### Where has KMMP focused its investments in the last 12 months?

KMMP's main focus is to maximize the reliability and productivity of haulage fleets. In 2020, we field tested trucks for two important mining clients which resulted in a contract for the provision and service support of new equipment. In 2021, we are finalizing the details for two more field tests for

large mining projects. KMMP has opened a new ecofriendly branch in Arequipa, and implemented an electronic laboratory, as well as a machine shop in Callao facilities which have allowed us to internalize service work and therefore reduce costs and lead times.

### Can you explain how the technology Komatsu offers improves uptime, safety and productivity?

We offer a range of solutions including remote assistance and remote conditioning monitoring – Remote care and Miencare – which permit the digital maintenance management of the fleet and increase uptime. KOMTRAX is Komatsu's remote monitoring system that lets you monitor all the essential information about your Komatsu equipment directly on your computer, and Immersive Technologies kits (simulators for operators training ) and Komvision help increase safety and improving productivity, allowing the operator to have 360 degree vision and prevent collisions. Komatsu' SMARTCONSTRUCTION is a package of solutions which help and improve the service and performance of vehi-

## Frank Lazo & Erick Ruiz

FL: General Manager  
ER: Director of the Mining Division  
CUMMINS



FL



ER

### Can you provide an overview of Cummins' role and evolution in Peru's mining industry over the last years?

FL: Cummins Peru joined the KMMP family in 2011, contributing its knowledge and excellence to further enhance customer value and support. Our products and services are present in many sectors, with mining being the most representative business in Peru, followed by Automotive, Commercial Marine, Construction, Oil & Gas and several other key markets. In the last 2-3 years we have evolved significantly in the mining industry, along with the development of the country's mining projects, including but not limited to expansions of existing projects, as well as new projects which are currently awaiting approvals to move forward. Cummins works mainly, although not exclusively, with open-pit mining clients, and our goal is to contribute to further enhance their efficiency and productivity through product reliability and excellent operational support.

ER: Cummins offers a wide range of products to the mining sector, including trucks, shovels, and engines. For us, the engine is the heart of the truck, therefore we must

ensure it functions at the highest levels of efficiency and productivity, delivering the uptime required to meet customer expectations. This is our main priority.

### Which products have been driving the company's growth?

ER: The QSK 78 engine has evolved in recent years, from the conventional QSK78 to the QSK 78 MCRS. The biggest difference between the earlier QSK78 version and the new MCRS technology, is the engine's fuel injection, which generates more efficiency and provides additional cost savings for our customers (5%+ in terms of fuel consumption). We are very excited about this engine and look forward to growing the MCRS population in Peru.

### How important is innovation for Cummins?

FL: Innovation is very important and a key driver to ensure competitiveness moving forward. Cummins Peru is constantly looking to innovate and further introduce technology that complements our products and services, mostly technological developments coming from Cummins

cles via a remote controlled drone system. The UAVs collect data which helps to manage the safety and precision of Komatsu's and other brands equipment, allowing the operator to become more efficient. All of these technologies fall under the umbrella of 'One Komatsu', the companies philosophy to integrate operations instead of working in silos.

### 2021 is a year of significant anniversaries for KMMP and its associated companies, as well as for Peru. On that note, do you have a final message for our readers?

2021 is the 25th anniversary of KMMP, the 100th anniversary of Komatsu, and the 10th anniversary of our subsidiary Cummins. Along these 25 years, KMMP has become a strategic partner to its clients, recognized as a leading company that provides the highest quality equipment, technology and services.

Peru has a tremendous opportunity to double its copper production by 2030. We must take advantage of this, and create a climate which fosters mining investment and sustainable development. ■

Inc. For example, Preventech, a remote monitoring technology that allows our operations team to continuously monitor Cummins engines in the mining industry and ensure levels of productivity. Another example, currently under development locally, is our communication kit, which would provide real time video, images and audio from the technicians perspective to several individuals locally or globally. Furthermore, product innovations such as the MCRS technology, which looks to enhance engine performance and create additional value to customers is also a key example of technological solutions introduced.

### Moving forward, what is Cummins' strategy for growth in the mining industry?

FL: For the strategy in mining, QSK78 and QSK60 MCRS engines are being introduced in several operations and we hope their performance will lead us to new opportunities in the future. In terms of services, our efforts continue focused on ensuring the best support to customers with training and development initiatives, technology enhancements and innovation. ■

## Ángel Tobar

General Manager –  
Andean Region  
EPIROC



pers, from hundreds of kilometers away, both from an office and from the operator's home, who exercises a supervisory activity.

### How is Epiroc helping customers in the digitalization process, and how is this being adopted in Peru?

In this area, I can highlight the importance of Mobilaris, our information management system, which allows us to identify the position of people and machines within the underground mine. The system generates alerts, in case a problem arises, and allows optimizing travel times inside the mine. System monitoring can be done from a surface control room and troubleshooting is mostly done remotely. This represents a huge step forward for the sake of the safety of people and equipment.

It is important to mention, regarding the digitalization process in Peru that Epiroc mining equipment that is arriving in the country equipped with Certiq technology for capturing operation and maintenance data, is growing day by day. This growth reflects, both in the number of machines equipped with the Certiq system and, above all, in the quantity and precision of the decisions that our mining customers can make, based on the data provided by the machine and transmitted in real time to screens in the mine control room. As a significant fact, during 2020 we have established a basic Control Room at our headquarters in Lima in which, in coordination with our customers, we can monitor the activity of our machines and carry out analysis of the data provided by them.

Another element to consider is that we have projects in surface mining, in which conventional machines have begun their migration process towards increasing levels of automation, using our systems. In these cases, we closely follow the technological transformation projects of our customers and we have already been able to witness the first Pit Viper in Peru, operated from our customer's office, in remote operation mode.

Experiences like these generate the interest of new customers who can verify that this breakthrough technology works well here in the countries of our Andean region, with technology and available networks. ■

### To what extent has the pandemic accelerated autonomous technology at mine sites, and which technologies does Epiroc offer in this regard

The pandemic has been an accelerating element in the transition of mining companies towards increasingly autonomous operations. The prevention protocols aimed at limiting the transmission of the virus have led to a reduction in the capacity in offices and workplaces and, therefore, new means and locations have been necessary so that workers, not only administrative but also operational, can comply with their work, in a safe way and in a controlled environment.

Both in surface mining and in underground mining, the number of projects that include different levels of automation of our equipment has grown, very significantly, during the pandemic, not only in those that require new drilling machines, but also in retrofit projects for existing machines, incorporating remote and even autonomous operation functionalities into said machines.

As an example, the Level 6 of Automation or Total Autonomy of our production drilling equipment in surface mines, allows us to operate our well-known Pit Vi-

# Underground Mining Equipment

THE IMPORTANCE OF INNOVATION TO INCREASE SAFETY AND EFFICIENCY

Incorporating innovation in an underground mining setting is more of a challenge than in the spacious environment of an open-pit operation. Nevertheless, the need to introduce technology in underground operations has arguably been more critical during the pandemic, as strict social distancing rules have limited the amount of workers allowed in a mine.

Ángel Tobar, Epiroc's general manager of the Andean Region, observed an increasing interest from clients in new technologies, especially automation, digitization and interoperability. "In previous years automation and digitization, both for equipment and processes, had been advancing at a steady pace, but as a result of the pandemic both have become an urgent need in order to keep people protected."

Tobar noted that the uptick in demand had not only come from those that require new drilling machines, but also in retrofit projects for existing machines, incorporating remote and even autonomous operation functionalities into the equipment. "As an example, Level 6 Automation or Total Autonomy of our production drilling equipment in surface mines allows us to operate our well-known Pit Vipers from hundreds of kilometers away, both from an office or from the operator's home."

Finnish OEM Normet has been focused on mechanizing underground equipment for many years. Recent projects include the mechanization of the charging process for emulsion explosives

*Our latest implementation involves 3D technologies where our equipment is able to map a 3D view of what it has in front of it. Through this, the manipulation and handling of the equipment becomes more automated and precise and therefore there is less possibility of error.*

**- Alonso Echevarría,  
Executive Director – Latam,  
JH Fletcher and Co.**



with Orica-Exsa at Nexa's El Porvenir and Cerro Lindo operations, according to Franklin Pease, general manager of Normet Peru. "Mechanization is a constant process and it is a road of no return. Once you have mechanized a process, you will not go back to the manual alternative," explained Pease, noting that mechanized equipment requires less people, is safer, more efficient, and lowers costs.

JH Fletcher & Co, a US-based equipment manufacturer, is currently involved in three underground projects in Peru, according to Alonso Echevarría, the company's executive director for Latam. Elaborating on how JH Fletcher's third iteration of its data analytics and digitalization solutions help mining

companies become more productive, he said: "Our latest implementation involves 3D technologies where our equipment is able to map a 3D view of what it has in front of it. Through this, the manipulation and handling of the equipment becomes more automated and precise and therefore there is less possibility of error."

Echevarría went on to underline the importance of designing equipment with the operator in mind: "We are cognizant of the fact that we do not want to overwhelm the operator with electronic gadgets and practicality is thus key."

One of the Peruvian pioneers of underground mining innovation is Resemin, which has gained international recognition for its specialist equipment suited to narrow-vein operations. James Valenzuela, Resemin's CEO, says his company differs to the big OEMs as it does not focus on full automation, but rather ease-of-use for the operator. He elaborated: "Full automation can make machines less "confident" or 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."

Discussing the company's latest innovations, Valenzuela gave the example of the Dual Jumbo Resemin launched in 2020 after a trial in Kazakhstan, which performs both face drilling and roof bolting. He also revealed that in 2021, Resemin has requested a patent and will launch a brand new system to perform scaling with a jumbo. "Normally this is a hazardous practice because falling rocks destroy the machine, but Resemin's new T-Pointer system will reduce this risk."

In December 2020, Sandvik announced it would acquire DSI Underground, with the deal set to close in the second half of 2021, when DSI will become part of Sandvik's Mining and Rock Technology division. Carlos Leigh, DSI Underground's regional CEO for Latin America, clarified that the company will maintain the independence of its operational and commercial activities which have made it a leader in the Latin American market, but now with the weight of one of the major OEMs behind it.

Before the Sandvik transaction, DSI Underground and ABC Canada launched

the joint venture DSI Underground Ventilation Systems, and Leigh spoke enthusiastically about the progress made and client reception of the new product line. When asked how demand for ventilations could be impacted by all-electric mines, he responded: "Ventilation is not just about the way in which we inflow air to compensate for the use of diesel in a mine... The main purpose is to maintain ventilation and speed up the cycles after the burst, and this will not change with the incorporation of electrical machinery. There might be a reduction of fan diameter and pressure, but ventilation will always be necessary."

On the topic of the relationship between ventilation and electrification, Soren Canepa, general manager of Peruvian ventilation specialist Airtec, explained that the focus in electric mines will shift from monitoring diesel emissions to monitoring strata gas emissions, dust and heat. "Mines are getting deeper and are having to deal with higher strata temperatures and relative humidity. Worker heat stress is becoming a constraint to production and large, expensive chilling plants are required to bring the working zones into compliance."

Reflecting on the reality today and outlook for the foreseeable future, Canepa pointed out that as electric-powered machines enter into the underground mining space, fleets will be made up of both diesel and electric equipment. "Within this mix of equipment, distribution of the air will be dependent on where those vehicles are located underground. A strong, advanced, smart ventilation system will be required."

Maintaining air quality is another important consideration for mining operations. To this end, Atlas Copco has seen high demand for oil-free compressors, according to Vicente Trenado, general manager, of Atlas Copco Peru. "Oil-free air compressors are a unique technology that maintains air quality," said Trenado, observing that this demand is linked to the increased demand for oxygen plants. He added: "Atlas Copco has also collaborated with the solidarity initiative Respira Peru which is building oxygen plants throughout the country." ■

## Carlos Leigh

Regional CEO – Latin America  
DSI UNDERGROUND



**In December 2020, Triton announced it would sell DSI Underground to Sandvik. When will this deal close, and what will this mean for DSI's operations in Latin America?**

We expect the deal to close early in the second half of the year 2021, which is closer than what was anticipated when the acquisition was announced. DSI will then be part of Sandvik Mining and Rock Technology. The integration plan is already in place, but it will take some time to properly incorporate the business and we will probably not see any important changes in our structure and the way in which we do business in short term. We will maintain our operational and commercial activities which has made DSI a leader in the Latin American market. Sandvik is a strong global entity which we are proud to be a part of and allows for new synergies, opportunities, and expectations for both our business and our people. We will still be able to make our own decisions, but now have the weight of a big OEM behind us to develop products, services, and technologies more thoroughly, favoring our customers.

**What progress has been made regarding the DSI Underground Ventilation Systems JV, and what are the benefits on this product line?**

Tremendous progress has been made and the reception of this product line has been incredible, even more than we expected when we started with the project. We feel that we have the responsibility to offer our customers the best quality products and services at the best possible prices, and we have achieved it through DSI Underground Ventilation Systems. We are the only company in the region, which is producing fabrics (main raw material), specifically for the mining industry, which has given us a higher quality of raw material to work with.

This, combined with the best design and the best people, results in a very good quality finished product.

**How do you see demand for ventilation systems being impacted by all-electric mines?**

Ventilation is not just about the way in which we inflow air to compensate for the use of diesel in a mine, but also the capacity to speed up cycles after the burst. The main purpose is to maintain ventilation and speed up the cycles after the burst, and this will not change with the incorporation of electrical machinery. There might be a reduction of fan diameter and pressure, but ventilation will always be necessary.

**In March 2021, DSI Underground acquired the training and VR company Edvirt. Can you elaborate on this transaction?**

Edvirt is a global leader in technologies and softwares related to training, which benefits our work in developing intelligence. Through virtual training platforms, we can create cost and time saving opportunities for customers, plus safety. Edvirt is creating the softwares and hardwares to proceed on a new path of virtual training.

**Have you seen the digital side of DSI's business gain traction?**

DSI considers itself an innovation company focused on digitalization, which is an important part of our progress and vision for the future. We are starting to see the digitization trend taking form in our Latin American operations, most notably with the WMS (Warehouse Management System) that will be installed in our Chilean plant soon. The WMS allows us to structure inventory in a much better way, offering full traceability from mill to mine for our customers. ■

## Franklin Pease

General Manager  
NORMET PERU



**What are some of the standout projects you have worked on in the last two years, and which of your services and equipment have been in high demand?**

Our focus has always been on shotcrete spraying in underground mining operations, and we have strengthened our position thanks to the trust of customers like JRC, AESA and Robocon.

We continue working on new solutions such as the mechanization of the charging process of the ANFO. In this respect, we have projects ongoing for Orica-Exsa at Nexa's operations in El Porvenir and Cerro Lindo. Additionally, we have carried out trial tests in other units with bulk emulsion loading.

**To what extent has mechanization increased in underground mining in Peru, and which processes are still yet to be mechanized?**

Mechanization is a constant process and it is a road of no return. Anything that is not mechanized is left outside

this new standard, so the challenge is to incorporate all the processes, little by little, to the mechanized workflow. The charging of the explosives is one of the processes that is still pending, so we see an important window of opportunity there.

**What are Normet's principal objectives in Peru for the next two years?**

We will continue with the mechanization of processes such as emulsion charging, scaling or even the shotcrete application, and then a step further will be the logistics processes, including the supply and movement of goods and people within the operation. Another area of focus will be the strengthening of our after-sales support. Finally, another pillar over the next years will be the collaboration with and training of our clients on the new technologies, so electronics become an ally and not an issue for them. ■

## James Valenzuela

CEO  
RESEMIN S.A.



**Have you noticed optimism return to the market since Q4 2020?**

Certainly. Now we are working almost at full capacity and have had many orders for equipment. Demand has been particularly strong from Peru, Mexico, Russia, Colombia, Brazil, Zambia and India.

**Can you explain the benefits of your machines in a narrow vein underground mine?**

Before the MUKI, Resemin's most successful range, there wasn't a machine fitted to work properly in Narrow Vein. This was a groundbreaking innovation for narrow vein mining, and remains very popular today.

**What do you think has been stimulating the interest in Resemin's equipment?**

Resemin offers what I would call disruptive machines, that are unique in the market. The simple design and ease of use is attractive for underground operations. The big OEMs talk about automation, but full automation can make

machines less "confident" or reliable, because it requires a lot of sensors and they fail because underground mining is the worst environment for them due to the corrosion, heat, humidity, dust, etc.

In 2020, Resemin launched the Dual Jumbo, which performs both face drilling and roof bolting. This is the most disruptive jumbo launched in the last 40 years.

In 2021, we have requested a patent for a brand new system to perform scaling with a jumbo. Normally this is a hazardous practice because falling rocks destroy the machine, but Resemin's new T-Pointer system will reduce this risk.

**What milestones would you like Resemin to achieve by 2022?**

We would like to Resemin's long-hole drilling rigs and face drilling rigs to match the success of our roof bolter. My main wish, however, is outside of Resemin; I would like Peru to establish good institutions and a strong economy to lead us through this challenging period. ■

## Construction and Ancillary Equipment

A COMBINATION OF PRODUCTIVITY AND FUEL EFFICIENCY IS DRIVING THE MARKET

Four months of operational paralysis made 2020 a year to forget for Peru's mining industry, as well as for the construction and ancillary vehicles companies that support mining companies. However, as operations ramped up in Q4 2020 looking to make up for lost time and a surge in metals price in 2021, the context has changed dramatically.

"Today (March 2021), we are invoicing twice as much within our mining operations as we were this time in 2020," revealed Oscar Jaern, CEO of Scania Peru, attributing the turnaround in fortune in part due to the resumption of mining activity, but also to fleets becoming older and therefore requiring more service.

In 2020, Scania delivered 77 vehicles to the subcontractor Dinot, which operates three underground mines – Nexa's Cerro Lindo, and Pan American Silver's Huaron and Morococha.

Discussing how Scania's solutions contribute to more efficient, sustainable operations, Jaern provided details of the soon-to-be-launched 10 x 4 Heavy Tipper, Scania's largest vehicle with a gross vehicle weight of 71 tonnes, a payload of 48 tonnes, five axels and a V8 engine. "The V8 engine allows the vehicle to have as quick of a cycle time as smaller vehicles. The high payload and quick cycle time increases operating capacity and reduces the number of vehicles required by the customer, thus cutting on costs."

On the aftermarket side, Jaern highlighted the company's full service contract offering where Scania assumes the risk of anything breaking and gives its customers a 90-97% uptime guarantee. "We are taking the risk out of the contractor's operation and putting the risk onto us since we believe we are the best at maintaining Scania fleets," he added.

Another of the Swedish OEMs involved in the space, Volvo, has implemented in-house service agreements with mining companies in Peru that cover qualified labor, spare parts stock, driver training, fleet management, connectivity and lube trucks, detailed Tobias Sigerstad, managing director of Volvo Group Peru. "This portfolio has an entire logistics support platform through our dealers' network that is strategically located near the mining projects, which allows us to have a timely response from our in-house warehouses installed in the mines," he said, adding that Volvo also has a platform for the automatic replacement of spare parts.

Sigerstad explained that Volvo's wide range of construction and ancillary equipment has been customized to Peruvian conditions, including high altitudes, varied temperatures, and corrosive terrain. He also mentioned that in 2021 the company has advanced its development of autonomous vehicles for the long-haul transport segment, and has started to develop fuel hydrogen cells on the path to zero emissions.

José Antonio Heredia, manager of Divemotor's trucks division, spoke of the company's decision to standardize its vehicles with superior technologies to those required by Peruvian legislation. "While Peru requires compliance with the Euro 4 set of rules in terms of fuel emissions, we decided to incorporate the Euro 5 regulation in our whole portfolio, including in our Mercedes Benz and Freightliner vehicles, meaning superior fuel efficiency."

Heredia added that Divemotor has also invested in technology to reduce repair and maintenance time, and has achieved 1,000 hours between intervals of oil and filter changes, allowing for greater vehicle utilization. To illustrate the fuel efficiency of its vehicles, Heredia gave the example of the fleet of 20 trucks with Euro 5 technology that Divemotor provided to logistics operator Ransa. "After two years of operation, the results have been impressive; while we guarantee 5% of fuel savings with respect to the average that they had in their fleet from other brands, they are achieving around 10%." ■



## Oscar Jaern

CEO  
SCANIA PERÚ



In 2021, we are focusing on expanding into the underground, mineral outbounds and passenger transport segments of the mining industry.

### How has demand picked up for Scania in the last 12 months, and what are some of the standout projects the company has worked on?

In June 2020, when things started gaining coherence and mines started opening again, Scania came back with full speed. This was partly due to all the activity in the mining operations space, the fact that we had managed to deliver more vehicles into our mining operations, as well as a part of the fleet becoming older which required more service. This has generated a situation where we are today (March 2021) invoicing twice as much within our mining operations as we were this time in 2020. One of Scania's main milestones is the delivery of 77 vehicles to the subcontractor Dinet, which is operating three mines – Cerro Lindo, Huaron and Morococha. All of these are underground mining operations, which is a new area Scania is entering with our Heavy Tipper. Our existing flagship projects include the Shahuindo mine and the El Brocal mine, where we have seen significant growth.

### What are the benefits of Scania's vehicles to mining clients?

Scania's main differential is the complete solution we offer to the customer in terms of product, service and finance. Looking at the product, Scania's Heavy Tipper solution, which offers the highest payload and highest uptime compared to other vehicles in the market, is

very popular and we can customize this robust product to mining customer's specific needs.

In terms of service, we firstly try to fully understand what the customer wants and needs. We offer a full service contract where we assume the risk of anything breaking and give our customers a 90-97% uptime guarantee. We are taking the risk out of the contractor's operation and putting the risk onto us since we believe we are the best at maintaining Scania fleets.

### Can you explain how Scania's service solution incorporates finance?

In terms of financing, the operating lease set up has been really popular. We offer a residual value in a future point of time, which takes the risk off the customer in terms of reselling the vehicle as there is already a fixed cost with a competitive interest rate. The asset is also on the balance sheet of Scania finance and therefore not on the sheet of the customer, which is beneficial for contractors as they have a fixed cost instead of a depreciating investment.

### Can you elaborate on the latest Scania solutions that contribute to more sustainable operations?

For 2021, we have clear targets to reduce emissions focusing on gas solutions. Scania has a large portfolio of gas-driven engines that can be placed in our vehicles.

We will soon be launching Scania's 10 x 4 Heavy Tipper, which has five axels and a V8 engine. This is Scania's largest vehicle with a gross vehicle weight of 71 tonnes and it offers a high payload of 48 tonnes. The V8 engine allows the vehicle to have as quick of a cycle time as smaller vehicles. The high payload and quick cycle time increases operating capacity and reduces the number of vehicles required by the customer, thus cutting on costs.

Scania has already put an electrical heavy vehicle on the market for distribution purposes, but it is not yet completely ready for the mining industry.

### What are the company's principal objectives for 2021?

Growth continues to be key for Scania. We managed to reach 9.3% market share in 2020, and have a goal to increase this to 12% for 2021. Looking at what we have been delivering in the first quarter of 2021, we are already above that target. In the mining segment specifically, we managed to grow our market share in 2020 to become one of the top three players of our subsegment in the industry. In 2021, we are focusing on expanding into the underground, mineral outbounds and passenger transport segments of the mining industry. We also want to continue delivering on the development commitments of the UN global pact, of which Scania is the only heavy vehicle manufacturer in Peru that is a member. ■

## Tobias Sigerstad

Managing Director  
VOLVO PERU



### Can you give examples of some of Volvo's latest technological advancements and how they add value?

Our leadership in transportation technology is driven by three main pillars: automation, connectivity, and electrification. Nowadays, we have a commercial autonomous transport solution in Brønnøy, Norway, with 6 FH trucks that transport limestone from the mine to the crusher.

Low noise levels and zero emissions are part of our priority. Volvo has been developing new clean transport solutions for many years now, not only with cleaner diesel solutions but also with other ones like biodiesel, CNG, hybrid and fully electric solutions. Our ambition is to have at least 35% fully electric vehicles sales by 2030, to sell 100% fossil free Volvo Group vehicles from 2040 and to be CO2 neutral by 2050.

With more than 1 million connected customer assets, we have the largest number of connected commercial vehicles and machines in the industry. Connectivity is essential to our goals in order to increase efficiency and minimize environmental impact, as well as making our roads safer.

Volvo Trucks presented its first electric in 2018, a connected and autonomous solution named Vera, designed for repetitive assignments in logistic centers, factories, and ports. This year, we also started to develop fuel hydrogen cells to have zero emission but also autonomy in the long-haul transport segment.

### What are the company's key targets and objectives to achieve by 2022?

Volvo has strong brand awareness and customer satisfaction among customers and operators within trucks. This is something that motivates us incredibly and makes us strive towards designing and producing a better product for our customers and also continue the development of our competent dealer network. ■

## José Antonio Heredia

Manager – Trucks Division  
DIVEMOTOR



### Which solutions have been in high demand from Divemotor's mining division recently?

All sectors, and especially the mining sector, are constantly looking to improve their activities through better management, efficiency and cost control. This is precisely Divemotor's business model; we seek to maximize the utilization of vehicle equipment, and achieve the highest possible reliability, efficiency, and the lowest possible operating costs through technology and innovation, while providing excellent after-sale support. All these solutions have been in high demand especially after quarantine, as businesses are looking to recover their pre-pandemic operating levels. Divemotor's vehicles also guarantee 5% of fuel savings through the application of new technologies, and this has also been extremely attractive to clients in the mining industry.

### What are Divemotor's main objectives in Peru's mining industry for the next two years?

Divemotor's growth is oriented towards the mining sector. This industry is becoming gradually more aware of the importance of how their concentrate is transported to the ports where it is shipped, and how the supplies that mines need to operate, such as lubricants and explosives, are transported into the sites. This is why we are currently experiencing strong growth in our vehicles for road transport, which incorporate very innovative solutions in terms of design and equipment. For instance, Divemotor has developed a specialized vehicle for rural areas to operate in places such as the southern mining corridor, where there is an intensive use of vehicles to transport concentrate to the ports. In addition, we intend to grow in terms of support vehicles that operate inside the mine. ■

# Equipment Components

## IMPROVING AND UPGRADING MINING MACHINERY

In the last five years, new mining operations (including Las Bambas in 2016), expansions (Toquepala in 2018), and developments such as Mina Justa and Quellaveco, have resulted in an expanding fleet of mining vehicles in Peru. This has offered a wealth of opportunities for companies specialized in equipment components.

While the pandemic stunted this growth, pent-up demand and high copper prices have contributed to a strong rebound in 2021. "Mining companies were busy with maintenance operations while they could not produce, which resulted in FUCSA having a backlog of orders when we restarted operations," related Raúl Ferrero, general manager, of Fundición Chilca (FUCSA), a Peruvian foundry which provides items for both processing plants and mobile equipment.

FUCSA's portfolio of products includes components for earth moving equipment such as crawler shoes and idler rollers, mill liners, crusher cones and mantles, pump parts and an array of other castings. Ferrero explained how its software allows for maximum production process control and design optimization: "By means of this software, we shape quality and increase efficiency, which defines filling parameters, solidification, residual stress and the metallographic structure." Discussing opportunities for suppliers of mining equipment components, Rexroth, a German hydraulic drive specialist that forms part of the Bosch group, sees potential for growth in the underground space, according to Kai Rothgiesser, general manager of Bosch Rexroth Peru. Rexroth currently participates in underground mining operations through contractors such as AESA and INCIMMET, or



Image courtesy of Bosch Rexroth

OEMs such as Resemin, for which it supplies components for mobile transport machines and loaders.

"In comparison to open-pit mining, underground mining needs more hydraulic equipment per tonne produced. This is especially relevant for mobile equipment, such as drilling equipment," explained Kai Rothgiesser, Bosch Rexroth Peru's general manager, who added that the service needs are also higher in underground mining because of rough conditions.

Nasdaq-listed Astec Industries is best known as a leading manufacturer of equipment for asphalt road building and aggregate processing, however, the company also supplies a wide range of mining products, including underground equipment, high-frequency screens, cone crushers and jaw crushers. Carlos Fonseca, regional managing director of Astec LatAm, was hired to start the company's Latin American operations in 2019, where the mining industry accounts for Astec's biggest client base. Fonseca used to be general manager of Komatsu's Peru and Colombia mining division, and acknowledged the competitive market for underground equipment. He mentioned the key to success is having robust, well-engineered products, as well as having extensive knowledge on the ground. "For instance, Canadine has been our distributor in Peru for over 30 years, so they have deep knowledge about the products."

Australian equipment provider, Austin, has seen a promising uptick in mining

purchasing power globally in 2021, according to Luis Flores, general manager of Austin Peru. He commented that the company's Peruvian sales in 2020 and 2021 have been concentrated principally in the southern region, working with clients such as Las Bambas, Southern Copper and Marcobre.

Explaining the ROI customers can expect using Austin's equipment components, head of business development for Peru, Santiago Guillermo, noted that clients have obtained 12% to 15% more production profit through the use of Austin's customized truck bodies. Elaborating on how the equipment adds value, he said: "We optimize the weight of the truck bodies in accordance with the requirements of the mine. The key is to develop the specific engineering and build truck bodies that are exclusive for each operation and each client, bearing in mind that climate conditions, density and operators are not the same despite using the similar equipment."

Valves, that regulate, direct or control the flow of a fluid, are another key component of mining equipment. Carlos Alva, general manager of ABSISA, the valve and flow control specialist, elaborated on the company's services, which include preventive and corrective maintenance and the detection of flaws: "We assist clients in the selection of the right valves, according to norms and to the parameters of application, and our technicians analyze all the relevant indicators of each valve, including temperature, pressure and airtightness." ■

# Raúl Ferrero

General Manager  
FUCSA  
FUNDICIÓN CHILCA S.A.



## How have bottlenecks such as the rising costs of logistics impacted demand for FUCSA's products?

Due to the rise in the cost of logistics, some foreign products became more expensive, which might lead to the market looking more towards local production. At the start of the pandemic, shipping and exporting was still easy if you could get to the port. Today, it has become more difficult as the price of containers has escalated five-fold and it is tough to find one. With regards to FUCSA's exports, we are still consistently delivering on time as we put in the extra planning.

The pandemic led to the closing of some mines, which affected the demand for our products. However, mining companies were busy with maintenance operations while they could not produce, which resulted in FUCSA having a backlog of orders when we restarted operations.

## Can you provide an overview of the products FUCSA offers to the mining industry?

FUCSA has four furnaces, six smelting kettles, three molding lines, boring machines and vertical lathes, as well as a fully equipped laboratory, which means that we can make various products at the same time. The products we engineer for the mining industry include components for earth moving equipment such as crawler shoes and idler rollers; mill liners and crusher cones and mantles; pump parts and an array of other castings. Although our business is mainly directed to OEMs and large mining companies, we can adapt to the needs of any client. By means of this software, we shape quality and increase efficiency, which defines filling parameters, solidification, residual stress and the metallographic structure. ■

# Kai Rothgiesser

General Manager – Peru  
REXROTH



## Rexroth's service center in Arequipa opened in November 2020. What were the reasons behind building the center?

We already had some sales representatives in the region, but the new location will push the service and repair activities in an important region for Peruvian mining. Previously, clients would send parts for repair to Lima, but the facility in Arequipa makes things more convenient and will allow for greater uptime.

## Can you tell us about some of the new technologies Rexroth is working on in the area of energy saving?

Rexroth is developing sensors measuring the energy consumption of motors, for example, whereby data is sent via clouds to the workplace of the customer. We then develop an interface together with the customer which serves their needs. It is the same principal as our conditioning monitoring, following up on industry KPIs such as temperature or vibration.

## Where would you like to see the company by 2022?

We are very optimistic about 2021, and the company is aiming at around 25% growth in Peru this year. I expect the current market dynamics to continue growing at a high rate for the next few years, as the outlook for metals prices is strong. Peru has now learned that the country cannot close down, and the industry is much better prepared for a second wave than it was in March 2020.

## Why should a mining company choose Rexroth as a partner?

Companies should make a bet on technology and digitalization. They are doing that, but it is something which must continue, because it is a trend which is not going away. In this regard, Rexroth is a very strong partner, with experience abroad, state of the art technology, and a technically-sound team. ■

# Comminution and Material Handling

INCREASING RECOVERY TO REAP THE BENEFITS OF HIGH METALS PRICES

Optimizing recovery is one of the highest return on investment (ROI) steps you can take at a mine. Furthermore, recovery is sustainable – it produces more metal at better utilization rates. In a country where permitting new projects is a growing challenge, and in a context of thriving metal prices, companies involved in the processing and handling of ore are particularly valuable.



Image courtesy of MMG-Las Bambas

On June 30th, 2020, Finnish giants Metso and Outotec finalized their merger to create Metso Outotec, combining the product offerings of two global leaders in technology and services for the mining and metal refining industries. The doubling of Metso Outotec's share price in the 12 months preceding the merger is an indication of the current strength of the service industry.

Fernando Samanez, Metso Outotec's VP mining equipment sales for South America, commented that the current priority for customers is to recover water and fines from tailings dams containing copper and gold. Samanez observed that the capex investment for a recovery plant is best suited to operations producing over 50,000 tonnes per day (mt/d).

"For example, a customer that spent, a customer that spent US\$1.50 per tonne for water recovery at its tailings dam wanted a solution which would lower capex. We were able to build a solution with a recovery cost of US\$1.30 per tonne, which gives a ROI within 30 months," he detailed.

Another multinational in the space, Weir Minerals plans to open its sixth service center in Peru in Q3 2021, inaugurating a Moquegua branch to ensure its support for Anglo American's Quellaveco mine as it transitions from construction to operation. Karina Zevallos, managing director of Weir Minerals Peru, revealed that the company has been investing in the R&D of technologies for the transition to Industry 4.0 in mining, such as its Synertrex platform. "Synertrex is a control and data collection system that obtains on-site equipment information, such as how different equipment interacts in the process, and product efficiency," she explained, adding that collected data is then analyzed by experts to optimize the performance of the entire circuit in real time.

Zevallos also highlighted the release of the second version of Weir Minerals' Hydrociclones Cavex 2 separation product. "The Cavex 2 allows customers to process more and have a better particle size cut, but with the same footprint as the original Cavex," she stated, before summarizing: "The better you can classify in a mill circuit, the better recovery you will have, maximizing profits."

Javier Schmal, vice president of Martin Engineering's Latin

American operations, mentioned that remote monitoring and remote technical support have become paramount, particularly during the Covid. Martin Engineering's remote monitoring solutions are currently available for its primary belt cleaner products, but will soon be applied to other product lines. To illustrate the potential cost savings of Martin Engineering's conveyor belt cleaners, Schmal related: "One of our customers revealed that they used to spend 10 times the money to actually clean their equipment compared to what they invested in our products to prevent cleaning."

Schmal went on to emphasize how the company's solutions focus on protecting workers from injury or illness, eliminating wasted motion and energy use, and to move as much product as possible in the system per given length of time.

One of the Peruvian players in the segment, Tecnomina, managed to increase its earnings in 2020 despite the disturbance of the strict lockdown in Peru, according to general manager Fernando Barrio. Barrio detailed that the company performed well in spite of the pandemic through the sale of Sempertrans conveyor belts to Las Bambas, Rema Tip Top cleaning systems to Las Bambas, Cerro Verde and Antapaccay, and a seven-month service for the maintenance of conveyor belts for Southern Peru Cuajone.

Barrio elaborated on the evolution of Tecnomina, which now provides clients with diagnosis and offers customized solutions. "We are getting increasingly involved in preventive maintenance, using high-tech equipment to evaluate the condition of conveyor belts, including dynamic radiographic equipment, ultrasound sensor equipment and scanning equipment," he said, adding that the technology can be used while the conveyor is in operation.

## Grinding Media

The increasing trend towards large-scale processing plants used in copper production is driving demand for grinding media. Upgrading grinding equipment not only increases produc-

tivity, but can also lower the opex of an operation. As companies reap the free cash flow from all-time-high copper prices, the capex decision to invest in new equipment has become more appealing.

Aceros Chilca is working with its customers to provide cast steel liners for crushers and SAG or ball mills, allowing the company to maintain significant volumes while developing its alloys. "We are currently working in a strategic relationship with our bars supplier to develop balls that are specific to each type of mineral and mine site, looking to increase our customers' productivity and decrease their cost of operation", explained Rafael Ravettino, general manager of Aceros Chilca.

He explained that the industry has migrated from smelted to forged balls in the last years, which are more wear resistant, reliable, and can process more ore. Aceros expects to expand production this year and, in 2022, to merge its plants in Chilca and Lima into one new and centralized foundry plant in Chilca with an annual production of 1,500 tons of pieces.

The export market also presents some appealing opportunities; Aceros exports to Chile, Canada, the US and Brazil, but plans to broaden this horizon towards Europe and Asia.

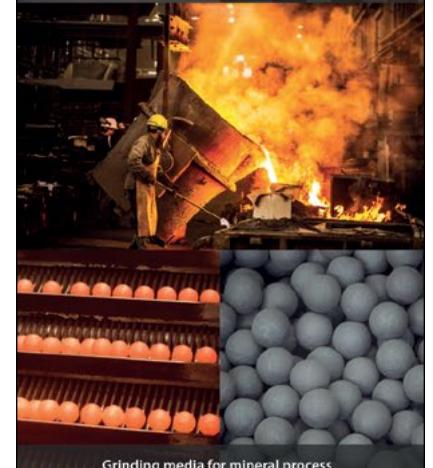
Eduardo Jiménez, technical director of Magotteaux, the Belgian company belonging to the Sigdo Koppers Group, underlined its expertise in manufacturing with high chromium, allowing for strong and resistant materials with a long lifespan.

"Magotteaux has used these composite materials to patent technologies such as Xcc and Xwin, which deliver an increased resistance to wear and shock, allowing our company to offer solutions that are set apart from the standard steel and iron foundry products", he explained.

Rudy Jaramillo, sales manager, added that clients can experience a 15-20 % cost reduction by using these products. The company is currently focused on generating synergies among the different companies of the Sigdo Koppers group to become more competitive, sustainable, to reduce costs and to incorporate new technologies. ■



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## Fernando Samanez

VP Mining Equipment Sales –  
South America  
METSO OUTOTEC



### The Metso Outotec merger finalized on June 30th, 2020. How has the integration of the two businesses been?

Metso Outotec underwent a transformation, establishing a new culture, mission and vision. I am pleased to say that based on Q1 results in 2021, we are exceeding stakeholder and marketplace expectations. We have combined the best of two companies and now we can deliver more to our customers, making the revenue opportunities huge.

Our business lines have been redefined, reengineered and aligned to the new strategy, therefore more responsibility is coming towards the Regions (like SAM) to be more proactive and have the ownership on proposals and technical sales support to our front end sales groups. We have key account and site managers for every important customer in the region, which makes us be more present day to day for our customers.

### Can you tell us about some of Metso Outotec's latest technological developments for crushing and grinding processes?

We have just formed a new group called IPCC, which stands for in-plant crushing and conveying solutions. Our IPCC group works with customers on the mine plan to design where the crusher needs to be located and how it needs to be built. Metso Outotec has also upgraded its MKIII crusher, and already sold around 15 units to Russia and Australia. We have also developed a FIT crushing station which is more standardized, and modularized plants which saves customers investment on engineering.

In terms of grinding, Metso Outotec pre-

sented select and premium brand mills to the market in April 2021. The premium brand is a combination between the best technologies of Metso and Outotec. These mills are engineered to order from data obtained by the customer. Our select mills are standardized and fit for purpose, with certain sizes and certain power ranges, helping reduce capex.

### Considering the high metals prices, what are the priorities of your clients at the moment?

Currently, the most important aspect for customers is to recover water and fines from tailings dams which have copper and gold content. With the current high metal prices, recovery means extra revenue. Within our plant solutions business line, Metso Outotec is focused on the modularization of plants to recover water and content in tailings. We sell the entire solution – filters, structures, thickening, pumps, piping, and electrical components. We have implemented our solution for two important customers in Brazil, but at this stage are only offering it as small scale plants that will be replicated in a bigger scale in the near future. If you have an operation producing over 50,000 tonnes per day (mt/d), a recovery plant is worth it as the ROI is quite quick. For example, a customer that spent US\$1.50 per tonne for water recovery at its tailings dam wanted a solution which would lower capex. We were able to build a solution with a recovery cost of US\$1.30 per tonne, which gives a ROI within 30 months.

### How would you compare the adoption of new technology in Latin America

### compared to some of the other jurisdictions that Metso Outotec works in?

Mining customers in South America are quite conservative and traditional and want proven technology before they adopt. Metso Outotec has a different perspective as we have been leaders in innovation. We are thus giving customers warranties on our solutions so that they can test new technologies and reap the benefits. We have experienced that Chile is more open to pilot plants and testing than other jurisdictions in South America. In contrast to South American jurisdictions, Russia is very willing to adopt and implement new technologies as soon as they are available.

### What does Metso Outotec offer in terms of digital solutions?

Metso Outotec can today offer a full digital plant to its customers and we have reached great heights in terms of automated monitoring. Today, we have more than 1,000 crushers being remotely controlled and monitored from our control center in Santiago. With our automated solutions, we are offering remote controlled mills for new projects in Peru such as Yanacocha Sulfides, Magistral and San Gabriel, free of charge for a period of time to validate the solution in front of the customer.

How is the political turbulence in South American impacting the way you do business?

Due to political uncertainty in South American countries, we need to be more united than ever with our customers. We are in a situation where a new constitution is being drawn up in Chile, and a new government is being elected in Peru, the two biggest copper producers. In the case of Chile, it has already been approved that royalties will increase from 3% to 5%.

One of the issues is that local communities often do not see the benefits of the money that mining companies pay to the state. The way in which governments serve communities needs to change, which will help change the perspective of the mining industry and enable growth. Structural changes are necessary, but we remain faithful that good things will happen in the region moving forward, as there is no shortage of opportunity. ■



## Karina Zevallos

Managing Director  
WEIR MINERALS PERU

### What are some of the key Peruvian projects the company has been involved in over the last 12 months?

In terms of greenfield projects and expansions, we have been delivering products to the Quellaveco project, working with Marcobre on the maintenance and installation of equipment. We are also working on the Yanacocha Sulfur project, but this project is currently delayed. For the Toromocho expansion, Weir Minerals successfully delivered and commissioned classification and pumping systems. We also set up the biggest and highest tailings pumping facility in the world at Toromocho, erected and commissioned by a 100% Peruvian team. We have also been working on optimization projects for medium and smaller mines where we are doing upgrades to eliminate bottlenecks and increase production.

Additionally, we have been able to close business optimization contracts in recent months with Cerro Verde and Las Bambas. Weir Minerals has a holistic view of the mining process and for us it is not just selling a product, but rather selling a whole solution. Throughout the integration of our products, we try to elevate the value chain of the customer and this approach has been well received by the Peruvian market. Although I believe that some optimization investments will be delayed until after elections, our approach differentiates us in the market, and the current metals prices offer an opportunity.

### Are all of Weir Minerals services centers in Peru now operational?

All of Weir Minerals service centers in Lima, Arequipa, Cajamarca, La Oroya and Espinar are now open and running. The opening of our new service center in Moquegua was delayed due to the pandemic, but we have restarted the process, are about to sign the paperwork with the owners, and expect this center to open in Q3 2021.

### Can you tell us about some of Weir Minerals latest technologies that help with metal recovery?

Weir Minerals has been investing in the R&D of technologies for the transition to Industry 4.0 in mining, such as our Synertrex platform. Synertrex is a control and data collection system that obtains on-site equipment information, such as how different equipment interacts in the process and product efficiency. Collected data is then analyzed by our experts to optimize the performance of the entire circuit in real time. This can be done remotely due to the virtual and digital tools we have available now, which results in significant cost savings for the customer.

We also recently released the second version of Weir Minerals Hydrociclones Cavex 2 product, which marks a new era in separation technology. The Cavex 2 allows customers to process more and have a better particle size cut, but with the same footprint as the original Cavex. The better you can classify in a mill circuit, the better recovery you will have, maximizing profits. This product has been very successful in projects around the world and is now being tested on projects in Peru.

### As the vice president of Women in Mining (WiM) Peru, how much have you seen diversity improve in recent years?

Diversity in the mining industry has not improved much, illustrated by the fact that over the past 10 years women have only represented around 6% of our industry. During the pandemic, two out of every three jobs lost were by women, as they had to take on more household responsibilities and were more likely to have to look after children than men.

On the other hand, I have noticed a real purpose from industry to become more diverse. Many mines are joining associations to learn what diversity means and to start the process of implementing policies and strategies to encourage more diverse participation in their organizations. Nexa Resources are leading the trend towards diversity in the mining industry, and they even have campaigns to educate their suppliers in this regard. Other mining players advocating diversity include Newmont Yanacocha, Gold Fields, Quellaveco, Las Bambas, Cerro Verde, Constancia, Hochschild amongst others. I really believe, and it has been proven, the only way in which diversity can be achieved is when the initiatives come from the top down. ■

We set up the biggest and highest tailings pumping facility in the world at Toromocho, erected and commissioned by a 100% Peruvian team.



## Javier Schmal

Vice President – Latin America  
MARTIN ENGINEERING

One of our customers revealed that they used to spend 10 times the money to actually clean their equipment compared to what they invested in our products to prevent cleaning.

### From an R&D standpoint, what solutions has Martin Engineering been working on in 2021?

We are focused on improving the reliability of systems through our solutions to increase the efficiency of mining operations. Remote monitoring and remote technical support has become paramount in today's time, and we are working on solutions and technologies which enable us to support our customers with specialized services from locations away from the mine site.

Martin Engineering is developing remote monitoring solutions which enables us to see if our products are working correctly, if they are well maintained, and when replacement of wearing parts will be necessary. Currently, our remote monitoring solution are applied to our primary cleaner products, but will soon be applied to other product lines. The mining industry has always been conservative in implementing new technologies, but the pandemic has dramatically accelerated the need for these solutions.

### What are the benefits of Martin Engineering's stand-alone pneumatic tension system for belt cleaners?

Our stand-alone pneumatic tension system delivers precise tensioning throughout all stages of our blades' life, reducing the labor typically required to maintain optimum belt pressure and extending the service life of both the belt and the cleaner. Equipped with sensors to confirm that the belt is loaded and running, the system automatically backs the cleaners away during stoppages or when the conveyor is running empty, minimizing unnecessary wear to both the belt and cleaner. The result is consistently correct belt tension, with reduced power demand on start-up, all managed without human intervention. This system increases safety, productivity and cost efficiency for the customer.

### What type of return on investment can clients expect when using Martin Engineering's solutions?

One of our customers revealed that they used to spend 10 times the money to actually clean their equipment compared to what they invested in our products to prevent cleaning. Our products and solutions focus on protecting workers from injury or illness, eliminating wasted motion and energy use, moving as much product as possible in the system per given length of time, maximizing production and revenues while minimizing costs, all of which add value to a mining operation.

### Looking towards 2022, which areas of the business and which regions do you see as having high potential for growth?

There are many opportunities in the technology space, particularly for remote solutions, and we aim to continue complementing our product offering with the latest technologies. Geographically, Brazil will continue to be a strong market for us, and we believe that we will see high growth in Mexico in the coming years. Peru has vast potential, and could even become a larger producer than Chile in the future, but this is dependent on improving the social conflicts that has slowed mining development. Regardless, it is still a very important market for Martin Engineering and a major player in the region.

### Do you have a final message about how Martin Engineering can help mining companies optimize production?

Martin Engineering wants to be a real partner to its customers. We work closely with them to fully understand their challenges, pains, needs and goals, and we personalize solutions depending on the context of the mine or client we are working with. We will always continue to develop solutions which increase safety, reliability, productivity, sustainability and profit and now more than ever, with new technologies. ■

## Fernando Barrio

General Manager  
TECNOMINA



It is going to take at least two years for everything to go back to normal. Therefore, we must take full advantage of virtual solutions to stay close to clients. Communication on various fronts is key in such situations.

### How did Tecnomina manage to increase revenues in 2020 despite the impact of the pandemic?

The pandemic had a great impact on Tecnomina's service supply because the qualified workforce, which was already quite limited in Peru, faced the issue of quarantine and mobility restrictions. This reduced our capability to meet our clients' demands. Despite this, we managed to mitigate the negative impacts through agreements with our collaborators to remain in the field for prolonged periods of time in order to reduce workforce turnover and trips as much as possible. Regarding product supply, Tecnomina had the necessary stock to meet our clients' needs. We did have certain problems with imports, as there were vessel restrictions due to the pandemic, but this did not reduce our company's revenues; in fact, we managed to increase our earnings by almost 3% compared to 2019.

Our rise in earnings came, first, from the sale of Sempertrans conveyor belts for Las Bambas, second, from the sale of cleaning systems from Rema Tip Top to companies such as Las Bambas, Cerro Verde, and Antapaccay, and third, from the sustained sale of our traditional products, and finally, from the provision of services to important clients such as Southern Peru Cuajone, who demanded a seven-month service for the maintenance of conveyor belts.

### Can you explain the benefits of the products Tecnomina works with?

Rema Tip Top has a range of first-class products for everything related to the reparation and maintenance of conveyor belts and, since 1970, it also has another unit for anti-wear, anti-corrosive and anti-abrasive coatings. For many years, Rema Tip Top had focused on products such as rubber, glue, tools, etc., but in 2000, with the Antamina and Yanacocha projects, we grew significantly in the service area. Another line of business of Rema Tip Top is in the automotive sector, specifically in tire repair. Apart from that, since their acquisition of the Dunlop unit in South Africa, Rema Tip Top also sells conveyor belts, and we are collaborating with them in this area of business.

However, Tecnomina is also an agent for other companies such as Sempertrans, a European brand that manufactures first-class girdles. We are also in contact with Chinese companies that supply conveyor belt-related products for a middle market. In summary, we have a wide range of suppliers to adapt to the specific demands of each market.

### Can you explain Tecnomina's focus on innovative solutions such as preventive maintenance?

Tecnomina is developing a plan to acquire new equipment to complement the stock of equipment we already have to better meet the demand of our cli-

ents: we aim to provide them with a diagnosis and offer them a customized solution. We are getting increasingly involved in preventive maintenance, using high-tech equipment to evaluate the condition of conveyor belts, including dynamic radiographic equipment, ultrasound sensor equipment, and scanning equipment. This technology can be used while the conveyor is in movement, which is a great advantage.

### What is your outlook for Peru's mining industry in 2021?

The mining industry is showing itself as the key pillar of Peru's economy, despite social conflicts. Mining companies have been providing support to remote communities during the pandemic through oxygen donation and other social initiatives.

### Considering the current situation, and the importance of social distancing, how do you plan to stay close to clients?

The provision of services is what keeps us close to our clients, and unfortunately, we currently cannot go physically to the field. Even if restrictions are progressively lifted, it is going to take at least two years for everything to go back to normal. Therefore, we must take full advantage of virtual solutions to stay close to clients. Communication on various fronts is key in such situations. ■

# Rafael Ravettino

General Manager  
ACEROS CHILCA



In 2024, we expect to inaugurate our new foundry facility in Chilca, with the goal of having one big, centralized facility with 1,500 tons of monthly production of castings and 7,000 tons of grinding media.

## Can you provide an overview of Aceros Chilca's activities and main milestones achieved in 2020?

Aceros Chilca is focused on the production and commercialization of grinding media (balls) and castings, mainly for the mining industry. The castings are made through our brand MEPSA, while forged balls are part of the Aceros Chilca brand. We are currently working in a strategic relationship with our bars supplier to develop balls that are specific to each type of mineral and mine site, looking to increase our customers' productivity and decrease cost of operation. 2020 was a tough year as the halt in the mining sector meant that there was a lower demand for steel. This affected our projections and, despite our positive results, we did not reach our objectives. However, 2021 has started very favorably, possibly due to high metal prices, as mines are aiming to increase production. Aceros Chilca has changed the strategy and is currently working with customers to provide them with cast steel liners for crushers and SAG/Ball mills. This has allowed us to maintain significant volumes and make interesting developments in our alloys, being able to provide our customers products that exceed their expectations, especially in terms of mineral processability.

## Which of Acero Chilca's products and solutions have been in high demand in Peru's mining sector in the past year?

Aceros Chilca has two main products that have been in high demand: forged balls, ranging from one to three and a half inches; and wear spare parts. We add value to our sales process with an effective presence in the mine and with valuable engineering services: we scan the mills and develop new designs jointly with our customers to achieve new alloys that allow them to process the mineral further. In the past, we produced an average of 8,000 tons of casted balls per month. However, the industry has migrated through the years to forged balls, which are much more wear resistant, reliable, and allow to process more ores.

## What solutions are being introduced in the supply chain to improve efficiency and reduce costs?

The strategic association with our bars suppliers allows us to improve the product's chemistry and manufacturing the bars for Aceros Chilca carries out the whole process of transformation to produce the balls, through the heat treatment, achieving the characteristics that customers need. We are currently trying to develop balls that have greater durability together with clients. Similarly, regarding the production of pieces, we are present in the mines working together with our customers, which allows us to understand their needs in terms of alloys or the design that allow greater performance and productivity.

## What initiatives does the company have in terms of social responsibility?

Our group promotes education in Peru and Chile, especially in reading and comprehension, through the Foundation in Peru - Margot Echeopar and in Chile - Sara Raier Rassmus (www.fsrr.cl). As a result of the pandemic, we have also taken measures to support and protect our workers, and the people who are close to our operations, providing them with oxygen and tests.

## What are Aceros Chilca's objectives for 2022-2023 and the opportunities you see for growth?

In 2021 we expect to grow by approximately 30% in terms of castings, and 20% in terms of grinding media. We are off to a good start, as we have already received purchase orders fulfilling a large part of our yearly production.

In 2024, we expect to inaugurate our new foundry facility in Chilca, with the goal of having one big, centralized facility with 1,500 tons of monthly production of castings and 7,000 tons of grinding media.

We also see important opportunities in the export market, as there are significant investments being made in the mining industry worldwide and we have plenty experience exporting our products. Aceros Chilca plans to reach these markets through partnerships with the main OEMs. We currently export to Chile, Canada, USA, Brazil and Mexico but plan to broaden the horizon of our company towards Europe and Asia. ■

# Innovation & Technology

## REMOTE WORK HAS INCREASED AUTOMATION, BUT CHANGE IS A GRADUAL PROCESS

The pandemic has unquestionably changed the way we work, however, most changes have been to cope with the constraints that Covid has imposed. In many cases, these are reactive rather than proactive; Zoom meetings replacing in-person interaction and technical support via video because of travel restrictions. However, Covid has also accelerated the use of remote-controlled, autonomous solutions, an important step towards a future that will depend on moving to automated, continuous production systems.

"We still hear, "what you are suggesting is not a pace of change that we are comfortable with," and herein lies the problem: disruption is not comfortable, but it is required if real progress is to be made," reflected Doug Morrison, CEO of the Centre of Excellence for Mining Innovation (CEMI), adding that the inertia that Covid has brought about creates the opportunity to make changes happen – if the will is there.

Marcos Wieland, general manager of Sitech, a Ferreycorp group company specialized in introducing technology solutions to mining operations, revealed that the company's initial expectation was that Covid would bring about a new interest in biosecurity and health solutions. However, Sitech found that interest in these topics peaked in 2020, then faded away as work dynamics began to normalize. "What we have observed is an increase in fatigue management, which has come as a result of longer work shifts during the pandemic," he said.

Sitech has also noticed an uptick in the adoption of technology that supports remote work, as miners are becoming

more interested in using tools that allow them to become more efficient without people in the field. Wieland gave the example of a rising demand for remote control centers, noting that, while many of these technologies existed before Covid, they have gained more traction during the crisis. "The early adopters of these technologies could potentially serve as a model for other mining companies and trigger a virtuous cycle," he said, suggesting that as more solutions are deployed, it is likely more people in the sector will become aware of how these technologies make processes more efficient. "Companies will have to move towards technology in order to remain competitive," affirmed Wieland.

TORSA, a Spanish company specialized in the research, development and manufacturing of technological solutions for heavy industry, has been working with SITECH in Peru for a number of years. One of its main solutions for the mining industry is a Collision Avoidance System (CAS), for which TORSA takes part in the Innovation for Cleaner, Safer Vehicles (ICSV) program carried on by the ICMM, as well as the Earth Moving Equipment Safety Round Table (EMESRT) working group.

Jaime Solano, TORSA's technical sales director, remarked that the company's solutions in highest demand are related to reducing occupational risks and improving safety, such as a Human Vibration Exposure Monitoring System that allows real-time analysis of the exposure to vibrations of equipment operators. "Mining companies are also demanding our High Precision Collision Avoidance System (HPCAS) to improve the vehicle interaction to protect shovels, haul trucks, auxiliary, light vehicles and personnel," he said, adding: "Safety always goes hand in hand with ROI since there is nothing more profitable than keeping your personnel safe."

Another of the companies working with SITECH in Peru is Zyfra, a Finnish-based company with its R&D center in Russia. Zyfra provides digital industrial solutions utilizing Industrial Internet of Things (IIoT) platforms and artificial intelligence (AI), and intends to grow its business in Latin America after establishing a strong client-base in Europe, Asia and North Africa, according to Víctor Huaco, Zyfra's

*The biggest challenge on the path to digitalization is the mindset. Here is where change management will play a key role, especially in legacy operations where most of the operators have done the same job the same way for the past 30 years.*

- Carlos Travezaño,  
CEO,  
Siemens Peru



Latam director. Huaco elaborated on the work Zyfra is doing with SITECH for Hudbay in Peru regarding the implementation of autonomous drilling technology: "Deploying autonomous solutions with drills, as opposed to trucks, is completely different. The drilling section is contained and easier to deploy, so you do not need to radically change the mining operation to implement this."

He noted that autonomous drilling solutions allow mining companies to save money quickly without having to make expensive, wholesale changes, revealing that in addition to Zyfra's work with Hudbay, he knows of five other large mines in Peru that are looking to deploy autonomous drilling solutions.

## Educating a traditional industry

When asked what the biggest barrier to the adoption of new technologies currently is, the response of our interviewees was invariably the human element. Mining is inherently a risky business, but the appetite to take further risks once a project is in operation can evaporate as

operations managers look to meet quarterly production targets. Implementing new processes in a mine is often far more disruptive than in other industries, and therefore the onus lies with the technology providers to convince clients of their benefits. "The biggest cost and barrier in adopting a new technology is not the technology itself, but rather the time the client will have to invest in change management," reflected Guido Perez, head of Micromine's Pitram business unit for the Americas region. "For example, Pitram is a tool which completely changes the operation of a mine, and therefore requires a substantial number of hours for training its users. In the case of Pucobre, this involves training 100 operators." In June 2020, Micromine closed its largest deal in Latam for the last three years with Pucobre in Chile. Perez noted that, while the training period for such a large project takes time, clients can increase the usability of their fleets by up to 10% to 15% within the first three months of

using Pitram, as well as using the information gathered to make decisions based on actual data gathered in real time. Wilson Monteiro, hub division manager – process industries for South America at ABB, echoed the sentiment that the biggest challenge in moving towards an autonomous operation is the human factor. "Our main job is thus educating rather than selling a product," he said, observing that many companies are trying to jump directly to fully autonomous operations without following the necessary steps. On that note, Monteiro divulged that ABB, Epiroc and Ericsson, supported by the Swedish Chamber, have collaboratively embarked on educating the market about the benefits of digitization and electrification. By way of example, he added: "By moving to autonomous and electrified options, ventilation (one of the largest costs in underground mining) becomes less of an issue." Carlos Travezaño, CEO of Siemens Peru,

opined: "The biggest challenge is the digital mindset. Here is where change management will play a key role, especially in legacy operations where most of the operators have done the same job the same way for the past 30 years... Fear of the unknown and fear of failure are perhaps the most common drivers to postponing digital transformation efforts." Travezaño added that another challenge is the lack of digital talent in the region and industry, and the time it takes to develop these skills within the current workforce. Eventually, the implementation of the digital mine concept will bring sustainability, allowing for continuous operations, more efficiency, and more flexibility due to all the data available to make a decision. This will result in faster investment recovery, more sustainable operations and happier stakeholders. However, it is a gradual process, and the providers offering a clear vision and visible path to ROI will be those making the early inroads.

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*The most common challenges we see is the need for increased efficiency and digital monitoring of equipment. We are also starting to receive significant challenges and solutions relating to industry 4.0. The industry is looking at how to integrate data for equipment in the entire mine to mill process.*

**- Emilio Gómez de la Torre, CEO and Founder, Linkminers**



**Stimulating Peru's mining supply chain**

For the industry to embrace technology on a large scale, it will require the buy-in of companies of all sizes, not only the tier one producers with big budgets. To that end, Emilio Gómez de la Torre created Linkminers. "We look to boost the future of mining through creating opportunities for everyone – large, medium, and small companies... creating an easy link between mining companies and mining suppliers," he said. Linkminers' digital platform helps companies connect without having to travel through the highlands of Peru, an expensive task at the best of times that has been further complicated by Covid medical protocols. The website is divided into sections, such as exploration, concentrator plants, digital mine, among others, and de la Torre revealed that the most common challenge clients are looking to overcome is the need for

increased efficiency and digital monitoring of equipment, as well as solutions relating to industry 4.0. He summarized: "The industry is looking at how to integrate data for equipment in the entire mine to mill process." For the industry to embrace technology on a large scale, it will require the buy-in of companies of all sizes, not only the tier one producers with big budgets. To that end, Emilio Gómez de la Torre created Linkminers. "We look to boost the future of mining through creating opportunities for everyone – large, medium, and small companies... creating an easy link between mining companies and mining suppliers," he said. Linkminers' digital platform helps companies connect without having to travel through the highlands of Peru, an expensive task at the best of times that has been further complicated by Covid medical protocols. The website is divided into sections, such as exploration, concentrator plants, digital mine, among others, and de la Torre revealed that the most common challenge clients are looking to overcome is the need for increased efficiency and digital monitoring of equipment, as well as solutions relating to industry 4.0. He summarized: "The industry is looking at how to integrate data for equipment in the entire mine to mill process."



Linkminers works with the Mining Cluster of Southern Peru (CMSP), created in 2018 on the back of successful mining cluster developments in Antofagasta (northern Chile) and Australia. Benjamin Quijandria, CEO of the CMSP, explained that an important pillar of the CMSP is its open innovation program, launched at the end of 2019. The program features eight main challenges affecting mining companies, including CMSP members Hudbay Minerals, Anglo American, Southern Copper and Cerro Verde, which were identified by visiting mining operations and talking to officials and executives. "To complement our open innovation program, we plan to carry out workshops in alliance with the chambers of commerce of the region, universities and local institutes, and help companies reach all the necessary standards to register as providers for the mining industry," detailed Quijandria.

Erick Iriarte, CEO of B2B platform eBIZ Latin America, related that the cost structure of companies in the mining sector shows that about 46% of operating costs come from the supply and logistics processes. With this in mind, eBIZ was formed 20 years ago to optimize these processes, either by reducing business cycles or by improving the interaction between buyers, suppliers and service companies. "We developed an e-business solution called B2M (B2Mining) that streamlines B2B relations between players, from automating information exchange (i.e., payment dates, document registry) to increasing opportunities to do business for both buyers and suppliers," he explained. As business has become increasingly digital, Iriarte warned of the mounting issue of cyber security, with eBIZ seeing a seven-fold increase of cyber-attacks on mining companies in the past two years. "In most cases, the triggering issue was inside the company: not by technical malfunction, not by foul play, but by mere human error," he noted, underlining that protecting information is the only way in which companies can ensure business continuity. ■



*By moving to autonomous and electrified options, ventilation (one of the largest costs in underground mining) becomes less of an issue.*

**- Wilson Monteiro, Hub Division Manager Process Industries – South America, ABB**





## Marcos Wieland Conroy

General Manager\*  
SITECH

\*Until August 2021

The early adopters of remote technology and automation could potentially serve as a model for other mining companies and trigger a virtuous cycle.

### To what extent did external factors in 2020 impact the demand for technology at mine sites?

Our initial expectation was that Covid-19 would bring about a new interest in biosecurity and health solutions. However, we have found that interest in these topics peaked in 2020 but faded away as work dynamics began to normalize. While we have come up with some solutions related to health and new protocols, and we continue to work on solutions such as cameras to track workers and ultraviolet rays to measure temperature, this demand has not been as important as anticipated. What we have observed is an increase in fatigue management, which has come as a result of longer work shifts during the pandemic.

Sitech's most demanded services continue to be related to security, our main line of business. We have done a great job positioning ourselves as a company with a well-defined value proposition in this area.

### Have high metals prices been an incentive for companies to introduce innovation, or are companies currently more concerned with making up for time lost during lockdown?

One area that we have seen pick up is technology that supports remote working, as mining firms are becoming progressively more interested in using tools that allow them to become more efficient without people in the field. The demand for remote control centers is increasing, for example. Covid has been the catalyst for this move, which has encouraged some mining companies to introduce certain technologies. However, many of these technologies existed before Covid, they have just gained more traction during the crisis.

### Can you explain the working dynamic between Sitech and foreign technology providers, and give examples of some of the technologies you are introducing to Peruvian mines?

Sitech's objective is to bring to Peruvian mines the best practices and solutions they need to be more efficient. Our role is extremely dynamic as we must work closely with our customers to understand their needs, investigate if we

are able to provide the right solution for them, and contact the best providers. Therefore, we need to have a deep knowledge of technology, of our clients' needs, and of the industries that we are targeting. One of our key success factors is having the right providers and bringing the best solutions to the market as efficiently as possible.

For about a year and a half, we have been focusing on open-pit projects, working with some excellent providers. For example, Sitech is currently working on a project with the Finnish-Russian company Zyfra, developing an autonomous driller. This will be deployed in one of the big copper mines of southern Peru and will improve the efficiency, productivity and safety of its drilling operations.

### Do you think the growing adoption of remote technology and automation could trigger a snowball effect whereby it becomes the norm for mining companies to work with such innovation?

The early adopters of these technologies could potentially serve as a model for other mining companies and trigger a virtuous cycle. As more solutions are deployed, it is likely that more people in the mining sector will become aware about the benefits of technology and how it makes processes more efficient. In the future, companies will have to move towards technology in order to be competitive. However, in the short term, this is still a process that takes time and we will not see wholesale changes overnight. Our role at Sitech is to educate the market on the benefits of technology and the importance of Industry 4.0.

### Which technologies do you envisage will drive growth in the mining industry in the coming years?

I believe technological advances in the areas of automation, remote controls and operations, virtual reality, artificial intelligence, and machine learning will become gradually more important in the mining industry in the coming years. Safety has always been fundamental to mining operations, and technologies that provide better security will continue to be in high demand for this reason. ■

## Jaime Solano

Technical Sales Director  
TORSA



### Can you introduce TORSA and explain the company's involvement in the mining industry?

TORSA is an R&D company based in Spain. When it comes to mining, we develop solutions to improve safety, reduce occupational risks and optimize productivity rates in operations.

### Which of TORSA's mining solutions have been in high demand in the last two years?

The first is a Human Vibration Exposure Monitoring System, which allows real-time analysis of the exposure to vibrations of the operators of haul trucks and other equipment, being able to immediately alert when the safety levels based on ISO 8041 are exceeded. This system also provides heat maps of the status of the lanes and areas of the mine operation for the different departments of the mine to study the need to send the graders and have optimal lanes maintenance to reduce the vibration exposure of the operators and increase the lifetime of the tyres.

Mining companies are also demanding our High Precision Collision Avoidance System (HPCAS) to improve the vehicle interaction to protect shovels, haul trucks, auxiliary, light vehicles and personnel. Our solution is the only one on the market with centimetre-level precision using LIDAR 3D, in addition to TOF, GPS and RFID technologies.

### What benefits can mining clients expect if they use TORSA's equipment?

Our HPCAS for shovels has allowed Antamina to increase the loading rates of the shovels of the operation. When the mining company analyzed how our system increased the safety during the loading operations, they identified a significant reduction of collisions with the shovels and an increase in the number of haul trucks loaded per hour in comparison to before the system was implemented. ■

## Luis Palenque

President and Managing Director  
Andean Region  
3M



### Which products is 3M supplying to Mina Justa and Quellaveco?

3M is involved in the full lifecycle of mining projects, from exploration and implementation, through to construction and production, and we work closely with clients to supply them with solutions. For Mina Justa and Quellaveco, we have been specifically involved in delivering electrical solutions for connectivity and energy. We have also provided PPE and system protection solutions to keep the large workforces at these operations safe.

### Considering the current lack of major greenfield projects set to move into construction, how can service companies increase their presence in Peru's mining market?

We increase our market presence by having a diverse portfolio of solutions. For example, maintenance services are very necessary, and there will be potential for brownfield expansions on existing projects, particularly due to high metals prices.

### How does 3M design its products with sustainability in mind?

Some of the changes made include migrating our portfolios and solutions to digital platforms. Even as a customer, we select suppliers and companies based upon how sustainable they are. We are also focused on helping customers become more sustainable and have made great progress in the areas of solar energy and water purification and filtration.

In this sense, at the beginning of 2019, 3M announced that each product developed must comply with the Sustainable Value Commitment, which includes reuse, recyclability, energy savings, waste reduction, water savings, responsible sourcing and the use of renewable materials appropriate for each specific product.

Finally, I would like to highlight that 3M's sustainability strategy is moving forward and is including new objectives, including to achieve 30% less carbon emissions within the next 10 years, zero-carbon footprint by 2050 and 30% less water consumption by 2030. ■



# SERVICE PROVIDERS

"Peru is a mining country with a lot of opportunities, but because of the size of the mining industry here there are a lot of regulations and authority involvement. Therefore, sometimes processes can take longer than in industries with less companies involved in the value chain"

- Wilson Miranda,  
General Manager,  
Confipetrol Andina



# Drilling

## ACTIVITY FROM PRODUCERS AND JUNIORS HAS PICKED UP SIGNIFICANTLY IN 2021

Despite being one of the fundamental value-creators for mining producers and juniors, drilling was not considered an essential activity during the first lockdown in 2020 in Peru. However, this sub-segment of the industry rebounded strongly in the second half of the year, and its outlook for 2021 appears as bullish as it has been for many years.

The increase in the participation of the exploration sector is one factor, illustrated by the amount of financings by Peru-focused juniors on the TSX Venture Exchange doubling from 2019 to 2020, with the amount of capital raised increasing by over 300% in the same timeframe.

Additionally, rising metals prices have given the impetus to producers to expand brownfield exploration programs, a point emphasized by Hochschild CEO, Ignacio Bustamante, who commented that he could not remember a time “with so many meters to drill.”



*Novamera's SMD (Sustainable Mining by Drilling) process is going to provide a turnkey solution to mining companies to be able to surgically mine steeply dipping, narrow vein deposits more sustainably, economically and safely compared to conventional mining methods.*

**- Dustin Angelo,  
President,  
CEO and Co-Founder,  
Novamera Inc.**



Such a context is providing ample opportunity for drilling contractors and equipment providers to grow their business, with both producers and juniors as clients.

Approximately 30% of Boart Longyear's business is in product sales and 70% in services, giving the company a holistic view of the sector as it supplies drilling contractors worldwide. “We have seen a significant uptick for exploration tooling and drill rigs, and over the past three months (February to April 2021) the demand has been higher than we have seen for several years,” revealed Jeff Olsen, Boart Longyear's CEO, who explained that exploration tooling is a good indicator for drilling. Elaborating on the company's exploration tooling products, Olsen highlighted the Longyear Diamond Bits line that helps drillers with longer bit life and faster penetration rates. He also cited tremendous global demand for Boart Longyear's surface coring products, such as the LF 160 drill rigs and Freedom Loader for rod handling. On the subject of future investments, Olsen added: “The Holy Grail for underground operations is hands-free drilling technology, and Boart Longyear has a prototype which is going to a test site in a few months.”

Through its contract with Las Bambas, Geotec has undertaken one of the biggest drilling campaigns in Peru in recent years. However, in addition to the issues MMG has had with reoccurring blockades of its copper concentrates, the pandemic has caused a fear of outside workers coming into local communities. “Mines often mobilize 3,000 to 4,000 people from outside the communities and this is being regarded as a threat due to the health situation,” related Miguel Ángel Arenas, general manager of Geotec.

While Covid has accelerated the adoption of automated technology, Geotec had been working with automation long before the pandemic, according to Arenas, who underlined that the benefits of the technology go beyond just productivity and safety, but also help the environment by recycling water. Moreover, he mentioned that automation will be required to fulfil the uptick in demand for drilling services: “Geotec has been training new workers for several years now, but with the

increase in demand for drilling we are seeing, it will probably not be enough, so it will become necessary to automate more processes.”

On the subject of technology, Jorge Granda, general manager for Peru at AK Drilling International, related that his company has been focused on compact drilling equipment that is easy to use. “In collaboration with IDS, our technology branch in Chile, we have been developing technologies such as horizontal drilling, deep-pit drilling and automated diamond drilling,” said Granda, adding that while technology has improved efficiency and productivity, the human element of drilling is still important. “Remote work has accelerated during the pandemic and this is a good thing, but with certain activities, a level of skilled human intervention is necessary to maintain quality control and ensure safety,” concluded Granda, reinforcing the need to train the next generation of drilling contractors to meet growing demand.

lan Venero, general manager of MDH Perú, another of Peru's main drilling contractors, noted that there has been growing demand for automated solutions due to the pandemic, but only among large mining companies. He mentioned that MDH has been implementing equipment and technology that reduces human interaction with machines, as well as equipment that increases safety and reduces risks: “For example, we have introduced anti-impact gloves with special protection to reduce the risk of accidents for the workers' hands, we have manufactured special equipment for handling pipelines and internal tools, and we use anti-sleep clocks and GPS tools to follow the transfer of personnel, tools and equipment.”

Discussing where he sees opportunity for growth in Peru's mining industry, Venero replied that MDH currently sees more potential in brownfield exploration, as there are restrictions to open new projects in different areas due to permitting and social issues. “Mining companies are trying to grow inside their

units and extend the life of their mines,” he said.

G&G Perforaciones, a Peruvian drilling services company established in 2007 by a group of students from the National University of San Luis Gonzaga, Ica, has grown its business since gaining its first contract with Buenaventura. Marcos Garayar, general manager and co-founder, explained that in addition to a full range of drilling services, G&G designs its own equipment to take into account the ESG concerns of an operation: “We are developing technologies that reduce environmental impact, including solutions for water optimization, and solutions for the reduction of gas emissions and energy consumption.”

This focus on sustainability is one of the reasons G&G won a large international tender for a drilling contract at Lundin Gold's Fruta Del Norte mine in 2020, a milestone for the company which represents its first project outside of Peru. “Technologies which reduce environmental impact are being applied in Ec-



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## Jeff Olsen

CEO  
BOART LONGYEAR



### How significant are the Latin American markets for Boart Longyear, and do you see good growth potential in the region?

In some regions there are political uncertainties, often relating to entitlements for new projects and labour laws, putting a damper on what potential there could be, but we see Latin America as a prospective region with an extremely bright future. The prospectivity of metals, particularly copper, will be a huge driver for growth. Mining is a cyclical business and difficult labor laws create additional costs and really limit growth to a certain degree. However, I believe that a combination of world-class deposits and the robust outlook for metals offer great opportunities in Latin America.

### What percentage of your business is represented by product sales compared to drilling services, and which of these services has been in high demand in 2021?

Approximately 30% of our business is products and 70% is services. There has been a steady demand throughout the cycle for what we call percussive or production related tooling. We have seen a significant uptick for exploration tooling and drill rigs, and over the past three months (February to April 2021) the demand has been higher than we have seen for several years. Exploration tooling is a good indicator for drilling, and we have seen a strong take-up in growth in Latin America, Africa, and especially North America.

### Where do you expect to see Boart Longyear by 2022?

I believe that there will be significant investment into the mining industry over the next year and that drilling activity will be even higher than it is today in both exploration and in actual mine production. Boart Longyear would like to continue to progress its new technologies and products to a point where the benefits are evident, and they are accepted in the market. The holy grail for underground operations is hands-free drilling technology, and Boart Longyear has a prototype which is going to a test site in a few months. We believe that this technology is truly revolutionary as it will change the safety profile, reduce employee exposure, and increase the speed of drilling activities. ■



## Jorge Granda

General Manager – Peru  
AK DRILLING INTERNATIONAL

At the beginning of 2020, AK Drilling was working with more producers than juniors (a 70/30 percentage split), but this has been inverted, and currently our portfolio consists of 60% juniors and 40% producers.

### To what extent did the health crisis in 2020 impact AK Drilling?

2020 was a challenging year, but AK Drilling is built on strong foundations, so we managed to resist the crisis well. In fact, positives can be taken from the Covid-19 pandemic as it has brought us closer to clients, strengthened our fundamentals and reinforced our knowledge. I am grateful to our team for their commitment and to our company on a corporate level for its fast reaction to the crisis.

### What are some of the standout projects you have worked on in Peru and internationally in the last 12 months, and how has your client base evolved in that timeframe?

At the beginning of 2020, AK Drilling was working with more producers than juniors (a 70/30 percentage split), but this has been inverted, and currently (as of February 2021) our portfolio consists of 60% juniors and 40% producers. This is not because we have lost work with producers, but because junior participation has really picked up in the last six months. We have worked with many of the juniors active in Peru, and we are currently operate with 95% of the active juniors in the country.

For the producers, we have continued to work with the likes of Antamina, Gold Fields and Las Bambas, who have all been aggressive in their plans for brownfields exploration to replace reserves, a trend that should increase in 2021.

### To what do you attribute the increased exploration activity for juniors in Peru?

High metals prices have certainly been a catalyst, but I believe it is more than that. When mining was reactivated in July 2020, I spoke with one of our principal junior clients who related that the intentions of the authorities were starting to align with the mining sector, and the cumbersome bureaucracy that has plagued the industry was starting to be streamlined to expedite drilling permits. Obviously, there is still work to be done, but it is a step in the right direction.

### Do you think there is a risk that drilling could be forced to stop during the second wave of Covid-19?

The mining sector in Peru was reactivated in Q3 2020, and both the industry and the government have learned a lot since then. We have been successful in establishing the right protocols so that the workers that go to the mines are protected. If the protocols are followed, there should not be a need to stop activities again in future waves of the pandemic.

### Can you give us examples of the latest technology utilized by AK Drilling, and how it improves safety, efficiency and productivity?

AK Drilling focuses on compact drilling equipment that is easy to use. In collaboration with IDS, our technology branch in Chile, we have been developing technologies such as horizontal drilling, deep-pit drilling and automated diamond drilling. The aim of this is to improve efficiency and productivity, whilst maintaining the highest standards. In this respect, the human element of drilling is important. Remote work has accelerated during the pandemic and this is a good thing, but with certain activities, a level of skilled human intervention is necessary to maintain quality control and ensure safety.

### Considering the current context where the movement of people is restricted, what is AK Drilling's strategy for staying close to its customers in the next 12 months?

I actually think this has been strengthened during the pandemic. We are constantly in contact with clients, on the phone or via video calls. A big part of this is trust that has been built up over years, and favoring long-term relationships over spot contracts. It is important to stay close to a diverse range of clients where straight-forward interactions and transparency make a difference, especially in times where you cannot meet face to face. ■

cuador in a particularly aggressive way, as Fruta del Norte is in the middle of the jungle, so environmental treatment, and especially water treatment, is especially important," added Garayar.

Environmental concerns, and the wider ESG umbrella, are factors which Novamera Inc hope to address with its innovative SMD (Sustainable Mining by Drilling) solution. Dustin Angelo, president, CEO and co-founder of Novamera, elaborated how SMD is a multi-stage process with four main stages. First, a pilot hole is drilled down the dip of a vein, guided with an imaging tool. Next, a large diameter drill is sent in, which follows the pilot hole, excavates the ore and brings the material to surface using reverse circulation airlift assist – a low energy method of cuttings transport. Once the material is at surface, the third stage is to dewater and separate the ore. After the ore is processed, the fourth stage combines the tailings with cement and put the product into the hole created by the drilling.

"Essentially, the hole becomes a landform tailings facility. Approximately 50% to 60% of the material we take out, will go back down. This reduces the reliance on constructed tailings facilities, which also reduces risk," explained Angelo, stating that Novamera's SMD process will allow companies to surgically mine steeply dipping, narrow vein deposits more sustainably, economically and safely compared to conventional mining methods.

The demand for drilling-related products, such as fluids and additives, has also been robust in 2021. Industrias Morven manufactures viscosifiers, filtration reducers and drill hole stabilizers, and the company now accounts for 30% of the national market share in Peru, according to Pablo Moreno, general manager.

Moreno spoke about the company's laboratory, designed to carry out the analysis of materials, such as polymeric sludge systems: "The tests we perform measure the rheological properties of the fluids, which allows clients to optimize results in their drilling projects. There are many parameters to assess when testing, including the quality of the water used for the sludge, analysing filtering capabilities, and other material characteristics." ■



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## Miguel Ángel Arenas

General Manager  
GEOTEC



For some time now, mining companies have requested that their contractor complement their proposal with services such as sample logging, directional drilling, core drilling, among others.

### Considering high metals prices, have you seen a greater demand for drilling in 2021?

We are seeing many clients who want to make up for lost production during lockdown. The current high prices in metals have also increased the demand for drilling. However, drilling is facing the challenge of local communities who fear outside workers coming into their villages; mines often mobilize 3,000 to 4,000 people from outside the communities and this is being regarded as a threat due to the health situation.

### Can you tell us about some of the key projects Geotec has been working on in Peru, and which equipment has been in high demand?

Geotec's largest drilling project is currently Las Bambas, where we have 13 rigs working in the Cotabambas region. We also have an important project at Antapaccay, where we have water wells and large rotative drilling equipment, and in Yanacocha, where we have deployed five of our machines. Furthermore, the contract Geotec won to participate in the development of Line 2 of Lima's Metro, through a program of water wells, has been an important milestone for the company.

### Have you noticed an increase in the adoption of automation technology for drilling services?

During Geotec's almost 60 years of experience, we have been implementing technology that allows the automation of the drilling process, focusing on the safety of our operations and environmental care. In 2017, we implemented more than six teams with Rod Handler technology at two of our main operations.

Our newest acquisitions in technology includes a Canadian Foremost (Model DR24XHD 130K) dual rotary drill rig for water wells drilling, which will be the largest in Peru. It is to be deployed in Antapaccay mine. This rig will allow us to drill 500 meters deep water wells, using the Dual Rotary drilling system with a diameter of 17.5 inches.

### What would you say are the biggest challenges and opportunities for drilling contractors in Peru today?

Aside from social conflicts, another big challenge includes finding qualified personnel that know how to operate drilling machines. We have been training workers in this for several years now, but with the increase in demand for drilling we are seeing, it will probably not be enough, so it will become necessary to train more people or start to automatize more processes.

Among the opportunities, there will be a lot of work for drilling companies, as many clients are looking to make up for lost activity in 2020 and take advantage of strong metals prices. Another opportunity includes finding long-term contracts that allow drilling companies to invest in technology and safety. For some time now, mining companies have requested that their contractor complement their proposal with services such as sample logging, directional drilling, core drilling, among others. Geotec has implemented the directional drilling service within its commercial offering since 2019.

### What is your strategy to grow Geotec in the coming years?

Geotec's strategy is to become strategic partners of mining companies through long-term contracts that strengthen our relationship and the development of safe and efficient workplaces. We want to train drilling workers and implement automation solutions where we can.

### What direction would you like to see Peru's mining industry heading by 2022?

As an industry, our main hope is to have a government that supports investments and provides stability to the country and its investors. We also hope to improve relations between mining companies and the communities, and to see the Covid-19 crisis get better. If these factors are resolved, or at least improve, the outlook is very positive for the years ahead. ■



## Ian Venero

General Manager  
MDH

### Can you provide a brief background of MDH's activities in Peru in recent years?

MDH continues to be one of the main drilling companies in Peru. We have experienced significant growth throughout the years, but this growth slowed down between March and June 2020 due to the pandemic and the severe restrictions. Since then, the situation has stabilized but we continue to experience challenges such as greater costs, delays and new protocols. However, since the beginning of 2021 we have been well prepared; we have internal protocols in place to protect our workers and our clients have implemented external protocols. This year, we expect to reach a similar level to that of 2019 in terms of earnings and contracts, or even improve it.

### Can you tell us about MDH's recent clients and key projects you have been working on?

Our company is currently working on Hoschild Mining's main mining projects in Inmaculada, Pallancata and Arcata, as well as on some of their greenfield projects. We are also working on IAMGOLD's greenfield Los Tambos project, and with Bear Creek's Corani project, which will hopefully come into construction in 2021. We are also working for Sierra Metals with Minera Corona and at Larena with Barrick.

### What kind of technology and equipment has MDH recently introduced?

There has been growing demand for automated solutions due to the pandemic, but only among large mining companies. Therefore, we have been implementing equipment and technology that reduces human interaction with machines, as well as equipment that increases safety and reduces risks. For example, we have introduced anti-impact gloves with special protection to reduce the risk of accidents for the workers' hands. We have manufactured special equipment for handling pipelines and internal tools, we use anti-sleep clocks and GPS tools to follow the transfer of personnel, tools and equipment.

### What trends are you observing for your drilling services and for exploration?

Clients are becoming increasingly concerned with safety and environmental

protection. On the technical side, clients have been asking us for more deep drilling of 1,500 to 1,800 m, for which larger and more powerful equipment is needed, as well as very experienced personnel.

In terms of exploration, large mining companies in Peru are making substantial investments in brownfield and greenfield projects, which represents a great growth opportunity for our company, especially if metal prices continue to go up. We currently see more potential in brownfield exploration, as there are restrictions to open new projects in different areas due to permitting and social issues, so mining companies are trying to grow inside their units and extend the life of their mines.

### Can you explain the company's commitment to quality and what sets you apart from your competitors?

MDH was the first drilling company in Peru and currently has over 50 years' experience in the market. In 1994, a joint venture was created between MDH and Bradley Group, and since then our company has been trained and supervised by Canadian drillers and has used Canadian technology. From that moment onwards, our company has experienced exponential growth and we have not stopped investing in equipment, technology, safety, environmental care, social responsibility and training. Finally, clients are our utmost priority, so we do not limit our resources when providing services for them.

### What are MDH's goals in the medium term, and the company's internationalization strategy?

We aim to grow under our traditional guidelines, the ones that have been promoted by our director of engineering, Guido Del Castillo, since the beginning. In terms of future investment, we will continue acquiring high-end technology to carry out different types of drilling and we expect sonic drilling to become more important. We also expect to develop our area of consulting for the mining industry. MDH began its internationalization process in 2019 with a project at the San José Mine in Argentina. The pandemic slowed down this process in 2020, but our aim this year is to evaluate countries with good potential and to continue our growth in Latin America. ■

Clients have been asking us for more deep drilling of 1,500 to 1,800 m, for which larger and more powerful equipment is needed, as well as very experienced personnel.

# Third Party Services

## ADDING VALUE SO MINING COMPANIES CAN FOCUS ON THEIR CORE BUSINESS

Outsourcing has become part and parcel of successful heavy industry for many years, but third party service providers faced a unique challenge in 2020, as companies were forced to reduce workforces to the bare minimum and minimize the number of contractors on site. Labor-intensive jobs such as fleet maintenance are vital to the day-to-day activities of an active mining operation, but rely on a high level of activity at the mine site.

For Confipetrol Andina, a large player in the industrial third party services space, the pandemic resulted in a temporary reduction to its 4,500-person workforce, as many of the operations it supplied personnel to were not deemed essential. Its' services to the petroleum industry continued through lockdown, but despite Peru's economic dependence on metal production, the mining sector was not as fortunate.

Wilson Miranda, Confipetrol's general manager, related that the situation had improved by the end of 2020: "Fortunately today (January 2021), we are back to a higher percentage of working capacity, but social distancing measures make it difficult to achieve pre-Covid levels. While sales and profit were down between 5 to 10% in 2020, we expect to grow between 10 and 20% in 2021." Having worked for the likes of Nexa Resources, Minsur, Chinalco, Hudbay, Antapaccay and Las Bambas, rising metals prices offer increasing opportunity

for Confipetrol to provide its services, so that mining companies can focus on production optimization. Miranda elaborated: "Our third party services include the operation and maintenance of concentrator plants, open-pit equipment, fleet maintenance and underground mine equipment, and taking care of these concerns for mining companies means they can focus on their core business."

EFC, a Peruvian company which celebrates its 50th anniversary in 2021, works as a purchasing center that serves industrial maintenance, repair and operational supplies. The mining industry represents 60% of EFC's sales, according to Mauricio Mélinchon, commercial manager, who spoke about the company's wide portfolio of PPE supplies: "Since the beginning of the quarantine, we have operated non-stop to help the main mining companies and projects in the country in the continuity of their operations."

Leading French catering company, Newrest, has a large experience in catering, base camp and facilities management and is seeing great growth potential in the mining industry as the result of continuous development of the sector. One of its core area of business is in-flight catering, a sector that has been heavily affected by the pandemic, however its the company plans to develop its mining portfolio even further, and offer additionally alternative ser-



*Mining companies are seeing the benefits of outsourcing non-strategic assets such as vehicles in order to focus on their core business.*

**- Fernando Martínez,  
General Manager,  
Avis Peru**



vices through its Inflight plant, according to Lionel Moreira, Newrest's country managing director for Peru. "We own a production plant and can offer different ways to produce meals and build strong relationships to fulfill the requests of our clients," explained Moreira.

Newrest signed a contract with Mina Justa in March 2021 for the provision of food, hospitality, and facility management services for over 1,200 workers and started operations during national lockdown. "The first challenge in providing catering services to remote locations is the logistics," said Moreira

Sodexo is another important French player in the provision of third-party services in Peru, with a wide portfolio of services including food, laundry, cleaning, hospitality and facilities management. Despite the complex circumstances, the company started several new operations in 2020 with Hoschschild, Minsur, and Anglo American. These projects have reflected the sector's ability to adapt and to maintain supply chain continuity during an unprecedented

situation. The pandemic accelerated the inauguration of a command center the company had been working on for several years, according to Alfonso de los Heros, president of Sodexo Peru: "This command center constitutes a neuralgic center from which we can serve clients remotely with digital solutions, supervising their operations and carrying out safety walks".

Providing shelter and camp solutions for the mining industry is WHC del Peru, born from the association between the Canadian Weatherhaven Global and the Peruvian Cidelsa. WHC has vast expertise in the provision of shelter solutions to remote areas. Housing solutions are customized for each client taking into account geographical location, the duration and capacity of each project. "Our aim is to make shelters comfortable for the mine's workers, as their well-being is closely linked with the success of the project", highlighted Hugo Cueva, WHC's general manager for Peru.

While the pandemic posed some challenges for the company, it also brought substantial opportunities, as their temporary camps became highly requested by mining companies to keep their workers isolated before or during the execution of projects.

One of the areas of outsourcing with potential for growth in Peru is the rental market, which has not yet garnered the same level of penetration as in Europe or North America. American car rental company Avis focused on controlling costs in 2020 to mitigate the impact of the pandemic, according to Fernando Martínez, general manager of Avis' Peru, however, he expects to see 20% growth in 2021 on the back of vehicle rentals. Although spot rentals, oriented towards mining pick-ups, have suffered, Martínez revealed that there has been an uptick in interest for long-term rental contracts with mining clients: "Mining companies are seeing the benefits of outsourcing non-strategic assets such as vehicles in order to focus on their core business."

Martínez elaborated on the evolution of the rental market, with digital services now a pre-requisite for clients: "Several years ago, the rental business simply involved delivering vehicles to our clients, but today, we make all the information related with the vehicles available to

our clients through platforms and apps. If we do not offer customized information, our vehicles turn into a commodity where we can only compete by price." Part of the Sigdo Koppers Commercial (SKC) Group, SK Rental specializes in the rental of machinery and the sale of semi-new or used equipment, and has worked on many of the major mining projects in Peru, including Las Bambas, Cerro Verde, Mina Justa and Antamina. Edmund Egg Noche, the company's general manager, related how SK Rental has undergone a shift in its commercial discourse: "Instead of being known for a specific portfolio of products and services, we aim to be seen as solutions providers".

This shift includes investment into digital solutions, such as "Be Rental", a digital platform that, explains Egg Noche: "Captures the clients' needs and through that, provides them with a solution, locating the correct equipment and products, reaching them in a more modern and effective way."

### Laboratories

The recovery of the mining sector and high metals prices in 2021 have encouraged exploration activities from both producers and juniors, significantly increasing demand for laboratory services and metallurgical analysis. This presents tremendous opportunity for geochemical specialists, but has also resulted in long delays for assay turnaround due to a lack of lab capacity.

Although the challenge of keeping up with demand has delayed exploration results in a number of countries, Miguel Caillaux, director of Certimin, commented how the company has managed to reduce the response time of the geochemical tests from 20 to seven days for Buenaventura. In this respect, he described Certimin as a boutique lab as it can adapt to the requirements of each client.

Expanding on the current trends Certimin is observing for laboratory and metallurgical services, Caillaux said: "We are



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## Miguel Caillaux, Luz Blancas & Jonathan Campbell

MC: Director  
LB: Business Development  
Manager  
JC: Deputy General Manager  
CERTIMIN



MC



LB



JC

**We have evolved from a simple laboratory to a technological complex for development, as in addition to our lab services, we now provide auditing services and services to improve mining companies' labs.**

### What are the current trends you are observing for laboratory and metallurgical services?

MC: We are in the process of a technological upgrade of our labs, making investments in more efficient equipment and new services. Certimin is achieving increasing recognition from national and transnational companies as one of the most complete companies in the metallurgical field. Our services in the geochemical and environmental areas have also been growing, where we are implementing automated equipment for different projects. We are deeply committed to finding solutions that add value to our clients, so they can carry out their operations as efficiently as possible.

LB: Since 2020, we have observed that, in addition to reliability and response capacity, the market is significantly valuing "service commitment and attention" as a fundamental aspect of contribution to its operations and/or projects. As a result of Certimin leadership factor we have received the trust of many major companies.

### Can you tell us about some of the contracts Certimin has recently won?

LB: In addition to the above services, Certimin concluded the start-up of an onsite laboratory in one of the most emblematic units of the mining sector due to its outstanding use of seawater, allowing us to optimize the integration system of the processes in technical terms, operational commitment, objectivity and transparency as dictated by the ethical and functional values of the policies of both parties.

In terms of junior companies, we have a longterm business relationship with one of the main lithium and uranium mining companies that has recently confirmed the start of new large-scale operations of their drilling program. In the same way, there are other well-known companies that are expanding their portfolios and with which we have already established our participation from our office in Juliaca. Certimin is the only laboratory located in Puno, which we maintain to further contribute to projects in the region.

MC: We have managed to reduce the response time of the geochemical analyzes with the technological developments and process improvements carried out. We are considered a specialized or "boutique" lab, in the sense that we adapt to the requirements of each client and try to give them the best solution.

### Demand for labs has increased considerably due to high metals prices and exploration expenditure. How has Certimin dealt with this demand?

LB: In the first place, the commitment of our technical, operational, commercial and management team has been fundamental. Second, this year Certimin has acquired high-tech equipment to complement the equipment we already had with the aim of increasing the efficiency of our operations and processes. In fact, this is already showing its benefits in the operations that we are carrying out for our main clients and will allow us to reduce the response time of geochemical tests for other clients as well.

### Can you explain the benefits of your association with Chile's ECOMETRIC and Australia's GLENCORE TECHNOLOGY?

JC: Our alliance with ECOMETRIC allows us to develop environmental solutions that currently do not exist in Peru, customizing them to our clients' needs and taking advantage of their experience in the Chilean market. It allows us to offer services of online and continuous measurements for mining operations that are particularly important and that need constant measurement.

This year we will be installing the first Isamill in Peru for metallurgical laboratory tests. This equipment developed by GLENCORE TECHNOLOGY allows to reach fine granulometries, which broadens the spectrum for the study of metallurgical projects. At the same time, we will be implementing and certifying tests with Jameson cells, among others.

### What are Certimin's priorities for 2021-2022?

LB: Certimin's aim is to continue being a leader in the provision of services, incorporating technological advancements. We have evolved from a simple laboratory to a technological complex for development, as in addition to our lab services, we now provide auditing services and services to improve mining companies' labs. We are also entering the fields of plant diagnosis and improvement of mineral treatment plants. ■

## Wilson Miranda

General Manager  
CONFIPETROL ANDINA



**In new mines that are due to come online, especially Mina Justa and Quellaveco, the large workforces required to run various aspects of the operation also offer opportunities for third part service providers.**

### To what extent did the Covid-19 pandemic impact Confipetrol Andina's business in 2020?

Confipetrol works in the mining, petroleum and energy sectors, and these each had different contexts. The petroleum sector was considered essential and we managed to maintain a large percentage of work in this segment, but many mining operations were not initially considered essential. Fortunately today (January 2021), we are back to a higher percentage of working capacity, but social distancing measures make it difficult to achieve pre-Covid levels. While sales and profit were down between 10 to 15% in 2020, we expect to grow between 10 and 20% in 2021, while maintaining the highest safety and sanitary measures.

### What are some of the main clients and mining projects Confipetrol worked on in recent years?

Nexa Resources is one of our biggest clients, and we have worked for them at Atacocha, El Porvenir, Cerro Lindo and the Cajamarca refinery. We have also worked on a plant maintenance project for Yanacocha, as well as Marsa, Minsur, Chinalco, Hudbay, Barrick, Antapaccay, Las Bambas, among others. Our third part services include the operation and maintenance of concentrator plants, open-pit equipment, fleet maintenance and underground mine equipment, and taking care of these concerns for mining companies means they can focus on their core business.

### What measures have you taken to prevent contagion?

Since the start of the pandemic we have implemented Plan Covid, outlined by the Peruvian Labor Ministry. The use of PPE, such as masks, is required at all times, as well as distancing and cleaning hands and anyone that feels unwell must report immediately to be tested. Distance between beds at mining camps has been increased and cleaning procedures have been tightened.

### What differences have you noticed between the responses of the mining and petroleum industries to the crisis?

Peru is a mining country with a lot of opportunities, but because of the size of the mining industry here there are a lot of regulations and authority involvement. Therefore, sometimes

processes can take longer than in industries with less companies involved in the value chain. The petroleum industry suffered a lot in Q2 2020, but has rebounded and is now steady. Confipetrol works more with the petroleum industry in Colombia, and more with the mining industry in Peru. Both industries share high safety standards.

### Which markets do you see as having high potential for growth for Confipetrol?

The south of Peru holds a lot of potential, with companies such as Cerro Verde. In new mines that are due to come online, especially Mina Justa and Quellaveco, the large workforces required to run various aspects of the operation also offer opportunities for third part service providers. Looking further ahead, Buenaventura's San Gabriel and the Yanacocha Sulfides project are other important projects for Peru.

### What do you think differentiates Confipetrol in the third part services space?

With the exception of the pandemic year in 2020, Confipetrol Andina has grown 20% per year for four years. The main reason behind this is our team and its dedication to offering the highest quality service supported in asset management, which has helped us establish long term relationships with clients. The other key factor is our safety standards and our behavior-based management system to make sure that employees have a proactive attitude with regard to safety that has resulted in one of the lowest injury frequencies in the industry. Confipetrol has received the ISO 9001 certificate for quality, ISO 14001 for environment and OSHAS 18001 for safety.

### Why should a mining company choose Confipetrol as a long term partner?

We work with the same objectives as our clients and want mining companies to see us as the main operation and maintenance contractor that will solve your problems with the highest quality standards, safety and environmentally friendly actions. We also work with and employ Peruvian professionals, which contributes to the development of local communities in the country and ensure the local value chain can support its mining industry to the best capacity. ■

Image courtesy of Minsur



in the process of technifying our labs, making investments in more efficient equipment and new services. Our services in the geochemical and environmental areas have also been growing, where we are implementing automated equipment." Luz Blancas, Certimin's business development manager, spoke about some of the company's latest projects, including setting up a laboratory for Nexa Resources' Cerro Lindo, and working with juniors such as Panoro Minerals, Pucara Gold and Palamina (at Certimin's Juliaca base). She added: "We have had a long-term relationship with Macusani Yellocake, and expect to initiate new operations with them after the American Lithium acquisition is complete, working with over 40,000 m of drilling core."

On the R&D side of the business, Certimin has developed an alliance with ECOMETRIC in Chile, to develop environmental solutions that currently do not exist in Peru, revealed Jonathan Campbell, Certimin's deputy general manager.

Explaining how the collaboration with ECOMETRIC has helped Certimin learn from their experience in the Chilean market, he elaborated: "It allows us to offer online services of continuous measurements for mining operations that are particularly important and need constant measurement."

#### Logistics

Logistics was one of the few activities deemed essential by the Peruvian government, as well as governments abroad, so it did not stop domestically or internationally during the pandemic. However, the enforced halting of mining activities during 2020 impacted logistics providers in a country whose mineral production makes up 60% of its exports. Although we did not stop working, the mines were operating with no inbound or outbound logistics, and we saw very low occupation of our transport units," related Aurelio Palacios, general manager of

Acoinsa, speaking about the disruptions in Q2 and Q3 2020. On the other hand, Palacios revealed that the Peruvian logistics market has been far better in 2021, and the transport company with over 30 years of operations in Peru is expecting to achieve similar revenue to 2019.

Acoinsa transports heavy cargo for both mining companies and mining providers (such as Ferreyros and Komatsu), including electrical components, components for production, shells for mills, and components for mining process. "In 2020, we bought a freightliner fleet from Divemotor and a heavy load transportation fleet from Kenworth. The freightliner fleet was bought to move sulphuric acid for Mina Justa, as part of Acoinsa's contract with Marcobre. The fleet we bought from Kenworth was a renewal of part of our heavy load fleet," detailed Palacios. Observing that the cost of logistics has increased significantly in the past 12 months, due to new protocols implemented during the pandemic, the rise in fuel prices, and the US\$ exchange rate, Palacios underlined the importance of creative collaboration between suppliers to find lower cost solutions. Another company specialized in the transport of heavy cargo is Stierlift, which has formed part of the Ultramar Group for almost 10 years, a multinational logistics services company headquartered in Chile.

Aldo Macassi, commercial manager at Stierlift, listed the company's mining-focused services as the transportation of equipment for processing and concentration plants, mills, crushers, conveyor belts and large electrical goods. Stierlift also transports large earth-moving vehicles, drills and trucks for the likes of Caterpillar and Komatsu. "Any equipment with particularly large dimension and weight is our core business," he clarified. Discussing the company's objectives in Peru's mining industry, Macassi mentioned that Stierlift is currently involved in large capex projects, but intends to grow in the opex side of operations. Summarizing, he said: "In this respect we are amplifying the company's range of services so we can provide different options to mining companies, in addition to our traditional heavy cargo transportation. We are also working on warehouse management and docking systems which will help improve logistics times." ■

## Edmund Egg Noche

General Manager  
SK RENTAL



#### What is SK Rental's role in the Sigdo Koppers Group?

SK Rental is part of Sigdo Koppers Commercial (SKC), and the main role of this group is to distribute premium brands to different sectors, especially mining, construction and agribusiness. SK Rentals, specifically, is a specialized unit inside the group for the rental of machinery and for the sale of semi-new or used equipment.

#### Who are SK Rental's main clients in the mining industry and what is the size of your equipment fleet?

In terms of operations, we have been working with Las Bambas since construction of the project. SK Rental is currently an equipment provider for different processes of large mining operations, such as Cerro Verde, Toquepala, Mina Justa, Toromocho, and Antamina. Underground mining is also an important area for us, where we work with companies like Nexa Resources, at their Cerro Lindo and Atacocha operations. In addition, we work with some junior mining companies such as Minera Licuna, having participated in their operations for three years. SK Rental currently has a fleet of around 500 units, amounting to a value of US\$25 million, including industrial, earthmoving, and material handling equipment ■

## Aurelio Palacios

General Manager  
ACOINSA



#### Can you introduce Acoinsa and describe the type of heavy cargo the company transports for the mining industry?

Acoinsa is a transport company with over 30 years of operations in Peru. Today, we also work with cranes and yellow machinery in different industries. Our principal industry is mining, but we are also involved in the energy, construction, and infrastructure industries.

The company transports heavy cargo for both mining clients and mining providers. This includes electrical components, components for production, shells for mills, and all the components for the mining process.

#### What is currently the size of your equipment fleet?

In terms of modular lines, Acoinsa is the largest company in Peru, and we have over 100 modular lines.

#### What opportunities do you see for growth in Peru's mining market in the coming years?

I see four standout projects in Peru's mining industry that offer opportunity in 2021 – the US\$2 billion dollar expansion at Yanacocha Sulfides, the Antamina phase 1 and 2 expansion, Buenaventura's San Gabriel project, and Bear Creek Mining's Corani project. We will also be involved in expansions at Las Bambas, Antapaccay, Toquepala, and Hudbay's Pampacancha project. ■

## Aldo Macassi

Commercial Manager  
STIERLIFT



#### How has Stierlift evolved in recent years, and how has the pandemic impacted your business?

Stierlift has been in the market for over 80 years, and for almost 10 years has been part of the Ultramar Group, a multinational logistics services company headquartered in Chile. Speaking specifically about Stierlift, we have been classified as one of the 50 best companies in the world for Heavy Lift contracting.

The pandemic was certainly a challenge in 2020. However, logistics was one of the few activities deemed essential by the Peruvian government, as well as governments abroad, so it did not stop domestically or internationally.

#### Can you describe the type of heavy cargo the company transports for the mining industry?

For mining, which is one of Stierlift's key industries, we are focused on the transportation of heavy cargo including equipment for processing and concentration plants, mills, crushers, conveyor belts and large electrical goods. Furthermore, we transport large earth-moving vehicles, drills and trucks for the likes of Caterpillar and Komatsu.

Today, Stierlift also offers services of general cargo and dangerous/hazardous material such as explosives and combustibles. ■



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On August 27th, 2021, 16 mining professionals lost their lives in a road accident in Huallpachaca, Cotabambas. The GBR team expresses its deepest condolences to their families, colleagues and the Peruvian mining community. This book is dedicated to them.

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