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## Dear Readers,

Brazil's mining sector has roared to life in 2024. This year, the country was in the international spotlight, hosting the G20 summit in Rio de Janeiro and preparing to host the COP 30 in 2025. Mining production in the country is becoming increasingly diversified; the engine remains its iron ore sector, but there is an ever-growing number of projects across a suite of minerals, including gold and critical minerals from rare earths to lithium. This activity also translates into economic opportunity dispersed across the vast country, from gold projects in the north to lithium in Minas Gerais.

Key developments took place in 2024: Vale announced the entry of a new leadership team, with Gustavo Pimenta, formerly CFO, now taking charge as CEO. In the critical minerals space, developments included Pilbara Minerals' proposed acquisition of Latin Resources and its Salinas project for over US\$360 million, and Sigma Lithium receiving a R\$487 million binding commitment from the BNDES for a 16-year loan to fully fund Sigma's second Greentech plant, so that the company can double production. Most notably, the B3, Brazil's stock exchange, and the Toronto Stock Exchange (TSX) have announced a strategic partnership to boost the number of mining companies listed in Brazil and direct much-needed capital to the sector.

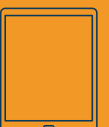
The *Brazil Mining 2024* report, part of our GBR Series, delves into these and other topics, providing a comprehensive annual guide to mining in Brazil and exploring the most topical issues with mining and industry executives across the country and the sector's value chain, from producers to engineers, consultants and technology providers, among others.

We are deeply grateful for the participation of our partners and interviewees. Thank you for choosing *Brazil Mining 2024* as your guide to the Brazilian mining industry.



**Alfonso Tejerina**  
Director and General Manager  
Global Business Reports

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Brazil Mining 2024



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# Introduction

“

Brazil has been establishing itself as an important region for mining activity globally, not only in traditional minerals but also in those considered strategic due to their economic, technological and industrial importance.

”

Ricardo Gilberto Azevedo  
President  
**KINROSS BRASIL**

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Image by Mariana Ianovska at Adobe Stock



# Brazil's Mining Scene

## A year of revival for the sector

Brazil found itself in the international spotlight this year, taking on the rotating presidency of the G20 for 2024 and hosting leaders from the world's biggest economies in Rio de Janeiro this November. The summit's motto, *'Building a Just World and a Sustainable Planet'*, underlines the Lula government's attempts to make green diplomacy the fulcrum of Brazil's foreign policy. There are two central pillars to this policy: custodianship of the Amazon rainforest and the provision of critical minerals for the electrification of supply chains. The mining industry is transforming in Brazil, growing, diversifying and coming under greater scrutiny from over-stretched regulators. Brazil is clearly a mining power, as the world's largest producer of niobium and second largest of iron ore, and home to Vale, which generates over US\$40 billion in revenue a year. This year, the mining giant announced the entry of a new leadership team, with Gustavo Pimenta, formerly CFO, now taking the charge of CEO.

According to figures from the Brazilian Mining Association (IBRAM), Brazilian mineral exports reached US\$42.98 billion in 2023. Despite these figures, over 50% of the country remains geologically unmapped, and several discoveries in recent years across different commodity classes, from gold to rare earths, point to the country's untapped potential. Brazil's mining sector is still dominated by iron ore production, however, there are developments and projects across a suite of different minerals laying the foundations for the country to become a leading exporter of minerals crucial for the energy transition. IBRAM's figures state that in the first six months of 2024, the mining sector's revenues totaled R\$129.5 billion, an 8% increase compared to the first half of 2023, pointing to an upward swing for the industry.

Marcos André Gonçalves, president of the Agência para o Desenvolvimento e Inovação do Setor Mineral Brasileiro (ADIMB), said: "There are several new developments in the mineral exploration scene for rare earth, lithium, and base metals... The energy transition has influenced the mining sector for good, with new exploration investments from Australian, Canadian and American companies."

The mining industry's principal challenge globally is access to capital. The sector is caught in a curious paradox between the increasing demand for critical metals and less financing available to develop long-term, capital-in-

tensive projects. Discussing Brazil's mining finance ecosystem, Guillaume Légaré, head of South America for the Toronto Stock Exchange and TSX Venture Exchange, said: "Brazil ranks fifth in Latin America, with 34 companies with 95 mining projects in the country. Given its size, this makes it a relatively under explored jurisdiction represented on our exchanges, underlining its potential. Although there is significant potential for growth in Brazil's mining sector, we need to promote it further to facilitate capital access for local entrepreneurs."

Mining leaders have stressed the need for more financing opportunities, and the reluctance from public investors and traditional banks to invest in long-term capital projects. Instead, private equity houses are picking up some of the slack. There are, however, public initiatives to encourage a mining finance eco-system in the country.

In addition to talks about promoting a Rio de Janeiro stock exchange, which will be more open to junior mining companies, Adriano Trindade, partner at Mattos Filho, a leading Brazilian law firm, said: "Currently, the Brazilian Development Bank (BNDES) is structuring a fund aimed at investing in critical minerals, particularly in exploration and development. BNDES will contribute 25% of the fund and is now seeking the remaining 75% from other investors."

The BNDES' activity in the past year suggests a concentrated effort from the highest levels of government to provide a more robust framework for mining investments. Flávio Moraes da Mota, the head of extractive and base industries department at BNDES, discussed how the bank is collaborating with Vale, raising R\$250 million each for a Strategic Minerals Fund: "The goal is to raise an additional R\$500 million from other market investors, reaching a total of R\$1 billion. Currently, 12 investment proposals have been received, and a new fund manager is expected to be announced in early October, with the fund operational by early 2025."

The BNDES' commitment to the mining industry extends beyond this fund and fits into a more comprehensive strategy by the government to fortify the sector and add value to mined commodities. Moraes da Motta discussed the government's 'New Industry Brazil' policy, aiming to

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## Raul Jungmann

CEO

BRAZILIAN MINING ASSOCIATION (IBRAM)

### Could you update us on IBRAM's recent activities and news in Brazil?

The past year has been a period of intense activities focused on establishing conditions for an environment of fully sustainable development for mining in Brazil. In 2023, we were at the center of the debates surrounding the protection of the Amazon and its future design, given its importance for survival on the planet. We placed IBRAM and its associates prominently in the United Nations COP28 programming. Other actions included our fight around combating illegal gold extraction and trade. We created new ties with international organizations and established direct dialogue channels with diplomatic representations.

By strengthening the links between IBRAM and established powers, we saw the Parliamentary Front for Sustainable Mining emerge. Other positive points were the inclusion of IBRAM in the National Council for Social Development, participating in the formulation of new industrial policy, and the fact that the federal government began to consider mining essential for the development of the Ecological Transition Plan. Regarding how the sector has performed, revenue from the iron ore segment fell from R\$153.5 billion to R\$148 billion, gold from R\$23.9 billion to R\$21.1 billion. Revenue from the following segments increased: copper, from R\$15.2 billion to R\$16.2 billion; dolomitic limestone, from R\$8.6 billion to

“The past year has been a period of intense activities, focused on establishing conditions for an environment of fully sustainable development for mining in Brazil.”

R\$9.5 billion; granite, from R\$5.1 billion to R\$6.5 billion; and bauxite was stable at R\$5.7 billion.

### Can you discuss the impact of the Selective Tax on the mining sector?

The proposed article 136, which maintains state contributions to infrastructure funds, should be eliminated since in addition to being severely questioned in the STF regarding its constitutionality, it burdens primary and semi-finished products and exports, all of which are the opposite of what the reform intended to resolve, increasing the tax burden. The imposition of the Selective Tax on mining in Article 153 is disconnected from the global norm since it will result in inflation, an increase in the tax burden and investment flight from Brazil. It discourages investment in the mining industry and will restrict economic growth.

### What is the importance of innovation to the Brazilian mining industry?

Mining has become known as an industry of major technological innovations thanks to advances in more sustainable production processes, with better productivity rates, better relations with surrounding communities, increased environmental preservation, etc. From the search for mineralized bodies by air-gravimetric gradiometry (Air-FTG - Full Tensor Gravity Radiometry) through autonomous off-road trucks to mobile technology

monitoring each operation in a mining project, the innovative environment in mining is growing every day.

The advancement of technology has been fundamental to the growth of mining, with satellite georeferencing being one of the pillars of major structural transformations in mining projects. Mineral extraction processes have been revolutionized by these techniques, making it possible to precisely zone the structures of target minerals, providing more specific interventions, reducing the generation of waste and environmental impacts and costs. Furthermore, mineral processing processes are becoming more efficient, with the increased recovery of minerals of interest, agglomeration of fines and ultrafine, recovery and reuse of waste, reduction or elimination of water used in the processes, more controlled comminution, and more effective concentration processes through the use of more selective reagents.

### What steps is IBRAM taking to promote ESG commitments?

The Brazilian Mining ESG Agenda, structured by the Institute in 2019, is the guiding principle for the mining sector and IBRAM itself. Mining companies associated with IBRAM, for example, focus on fulfilling an ESG Agenda, which covers twelve priority areas, namely: Process Safety, dams and tailings disposal structures, occupational health and safety, mitigation of environmental impacts, local development and future of territories, relationship with communities, communication & reputation, diversity & inclusion, innovation, water, energy and waste management. IBRAM adopted the TSM Brazil – Towards Sustainable Mining in 2019. It guides and supports mining companies in managing environmental and social risks.

### What are IBRAM's priorities and objectives for 2025?

Our agenda for 2025 will keep the focus on developing a sustainable mining environment in Brazil. Our work on improving the conditions for this sustainability, as recently done in Exposibram and Brazilian Mining Congress, will be repeated in the coming years. ■

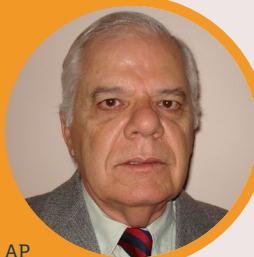




MG



RX



AP

“Our focus is maximizing the opportunities related to the energy transition, and leveraging the professional development and technologies that will shape the mining industry.”

## Marcos André Gonçalves, Roberto Perez Xavier and Augusto C. B. Pires

MG: President, RX: Executive Director and AP: Project Manager

**AGENCY FOR THE DEVELOPMENT AND INNOVATION OF THE BRAZILIAN MINING SECTOR (ADIMB)**

**Can you update us on ADIMB's activities and recent news?**

RX: Since the second half of 2023, ADIMB has been working on four long-term collaborative research, development and innovation (R&D&I) projects supported by mineral exploration and mining companies in partnership with multi-institutional academic research groups and government research centers. ADIMB was again present at PDAC 2024 in Toronto, as the organizer of the Brazilian delegation. This year, our delegation was the largest ever, with over 120 professionals, including core government personnel and CEOs from mineral exploration and mining companies currently in Brazil. We also organized the XI Brazilian Symposium on Mineral Exploration (SIMEXMIN) held on May 19 – 23, 2024, in Ouro Preto, with the slogan 'Mapping new horizons for the low-carbon energy transition'. Over 1,600 professionals attended technical sessions and panels, keynote presentations, exhibitor booths, short courses, and business meetings.

**How does ADIMB promote the scientific and technical development of the mining industry?**

RX: Collaborative R&D&I projects led by ADIMB have been very positive in attending to the geological and technological demands raised in early and late-stage exploration projects. Three of these projects have the sponsorship of VALE, Oz Minerals/BHP, and Centaurus, focused on copper-gold-nickel and iron deposits of the well-endowed Carajás (northern Brazil) and Quadrilátero Ferrífero (southeast Brazil) regions. More recently, a three-year R&D&I project was kicked off by Meteoric Resources. This project is being developed on regolith-hosted rare earth element deposits, formed by intense weathering of alkaline rocks from a paleo volcano in the city of Poços de Caldas. These projects help us understand the significant regional and deposit-scale ore-forming geological processes and propose new exploration tools that may convey better efficiency in assessing the company's exploration targets. Training has been another critical activity which has brought positive results to the mining workforce in Brazil. ADIMB has organized several short courses based on the mineral industry's demands, in particular, related to geology and exploration of critical minerals and metals deposits. Another capacity-building benchmark led by ADIMB is the launch of the MBA in Management of Mineral Resources in partnership with IBMEC, a prestigious higher education institution in Brazil.

**Can you provide an assessment of significant developments in Brazil's mining sector?**

MG: There are several new developments in the mineral exploration scene for rare earth, lithium, and base metals. Various new exploration projects have come to fruition, specifically in the Jequitinhonha region and the northeast. There are positive M&A signs. The energy transition has influenced the mining sector for good, with new exploration investments from Australian, Canadian and American companies.

**Can you discuss the main challenges faced across Brazil's mining value chain?**

AP: Integrating innovative technologies into mining operations and strengthening environmental and safety regulations are among the major challenges. Brazil is a global player in the production of commodities and has great potential for discovering new deposits. Exploring for deeper deposits in geologically complex settings requires the integration of conventional methods with modern technologies such as automation, AI, and Big Data, improving productivity and efficiency. From an economic standpoint, mining projects require significant upfront capital investments, particularly mid-tier and junior companies that generally seek capital in stock exchanges abroad. It would be advantageous if this capitalization could be done via investment funds in Brazil, as with the recent launch of the Strategic Minerals Investment Fund by the Brazilian Development Bank. Many mines are in remote regions with inadequate road or railroad networks and reliable and affordable energy supply. In the regulatory space, delays in the permitting process and frequent changes in mining laws and regulations have been roadblocks to the development of new projects. and discouraging long-term investments. We want to maintain continuous and robust ESG strategies to strengthen the bond between the industry and local communities that are economically dependent on mining. Providing adequate employment opportunities and training for local populations is crucial to ensure that mining benefits are widely shared.

**What are ADIMB's priorities for 2024/2025?**

MG: Our new biannual mandate starts with a focus on capturing and maximizing the opportunities related to the energy transition, as well as leveraging the professional development and technologies that will shape the mining industry. ■



“Given its size, Brazil is a relatively under explored jurisdiction represented on our Exchanges, underlining its potential.”

## Guillaume Légaré

Head, South America

**TORONTO STOCK EXCHANGE & TSX VENTURE EXCHANGE**

**Could you update us on Toronto Stock Exchange's recent activities in South America?**

In 2019, the Exchanges established a full-time presence in Latin America to connect mining, energy, and innovation projects with investors. Latin America is the most active mining jurisdiction outside of Canada, with 410 issuers and 1,067 assets and properties on the continent. Brazil ranks fifth in Latin America, with 34 companies with 95 mining projects in the country. Given its size, this makes it a relatively under explored jurisdiction represented on our Exchanges, underlining its potential. Although there is significant potential for growth in Brazil's mining sector, we need to promote it further to facilitate capital access for local entrepreneurs. Recently, we have seen increased activity in mining, with 29 new mining listings on TSX and TSXV this year as of June 2024, raising US\$6.8 billion of the total US\$12.2 billion raised across all sectors. The main focus in Latin America is on critical minerals, and the clean energy transition. The Sigma Lithium listing and subsequent success on our markets has helped to see an increased interest in the region.

**What is the interest of TSX in other South American markets?**

Argentina has shown significant activity, especially in the lithium sector. In 2023, we had 51 TSX and TSXV issuers with 166 properties in Argentina, primarily in pro-mining provinces

like Catamarca, San Juan, and Jujuy. Despite political uncertainties, these provinces have attracted substantial mining investments. Interestingly, Argentina now has more companies listed on our Exchanges with more projects than Chile.

**Could you elaborate on the rare earth sector in Brazil?**

Investors are beginning to understand the rare earth sector more and seeing its long-term growth potential. We also see interest from Australian companies with Brazilian properties raising capital in North and South America due to the same time zone. We have a full-time presence in Australia to assist ASX-listed issuers in dual-listing on TSX.

**What are the main challenges in raising capital for mining companies?**

Raising capital involves three key pillars: asset quality, management quality, and ESG compliance. A National Instrument 43-101 compliant technical report is essential for assessing a projects' potential. Quality management teams, ideally with a mix of local and international expertise, are vital. ESG considerations are increasingly critical. TSX provides tools to help companies communicate their sustainability efforts effectively. We emphasize that significant value can be created in the pre-operational phase, encouraging early-stage projects to list on TSXV. Brazil's capital markets

are strong but lack the mining expertise of global mining Exchanges. The Brazilian market realizes the need to support the clean energy transition locally. Companies like Aura Minerals and Sigma Lithium have issued Brazilian Depositary Receipts after listing on TSX. Interconnected markets are crucial, and while Brazil has abundant capital, developing a local investor base with mining expertise will take time.

**Could you elaborate on ESG requirements and the regulatory environment in Brazil?**

The regulatory environment in Brazil is indeed stringent regarding environmental regulations. At TSX, we provide our issuers with all of the necessary tools to communicate the sustainability aspects of their business effectively. This is not about restrictions but about ensuring transparency and proper communication with the market. Nearly 95% of our mining issuers now have sustainability reports. We have initiatives like ESG 101 to help issuers meet these requirements. We support companies in fulfilling their ESG mandates and effectively reporting on their sustainability practices.

**Can you discuss the TSX's priorities and activities for the next 12 months in Brazil?**

In Brazil, the focus of TSX and TSXV is extending beyond mining to energy and renewables. At the recent Brazil Lithium Summit, the importance of renewable energy was evident. Canada is a strong and established market for energy and renewable projects, which can spur activity in other jurisdictions across the Americas. We aim to attract renewable energy projects, starting with 100 MW producing assets, to raise capital in Canada. The synergy between mining and renewable energy is vital, particularly for decarbonization. Brazil's clean energy potential in wind and solar attracts investors. Promoting the clean energy transition is more accessible than promoting mining, given the negative perception of mining. However, mining is integral to the clean energy transition, and renewable energy can help decarbonize the mining industry. ■





## Silvio Lima

Head of Corporate Affairs, ESG and Community Engagement  
**APIAN CAPITAL ADVISORY LLP**

### Can you introduce us to Appian Capital Advisory LLP and its global presence?

We are a private equity house that invests mainly in mining, with over US\$3.6 billion of assets under management. We have brought nine mines to life since 2016, matching the output of major companies like Rio Tinto, Anglo American, Glencore, Vale, and BHP. We have over 85 investment professionals and ten global offices, including strong presences in Brazil.

### Can you elaborate on Appian Capital Advisory's investment portfolio in Brazil?

Our current portfolio in Brazil includes four companies: Atlantic Nickel, a nickel-producing asset in Bahia. It is one of the largest open-pit nickel sulfide mines globally, with the potential for 30+ years of operation. MVV (Mineração Vale Verde) is a copper-producing asset in Alagoas, acquired in 2018. Initially a Greenfield project, it was developed and commissioned by Appian and has the potential for 20 years of production. Graphcoa, a graphite asset in Bahia. Omnigen Energy is a solar power plant portfolio in Minas Gerais, which is expected to be completed in Q4 this year.

### What makes Appian different from other investment houses?

Appian boasts a powerful in-house technical team, unlike private equity firms that rely on external consultants. We have everything from geology and resource evaluation experts to specialists in mine planning, mining operations, metal processing, and tailings management. This in-house expertise allows Appian to evaluate projects more accurately, optimize them more effectively, and ultimately make informed and successful investments.

### What are Appian's plans for the next year in Brazil?

At Graphcoa we are completing the construction and commissioning and preparing for its ramp-up in production. At Atlantic Nickel we are gearing up for a transition from open pit to underground mining phases. Additionally, at MVV, we are studying and pursuing extending the life of mine to approximately 20 years. ■



## Flávio Moraes da Mota

Head of Extractive and Base Industries Department  
**BRAZILIAN DEVELOPMENT BANK (BNDES)**

### Can you provide an overview of recent developments at BNDES?

The BNDES plays a central role in implementing public policy in Brazil. Recently, the Brazilian government introduced the 'New Industry Brazil' policy, which has a significant financial component of R\$300 billion for supporting the industries of the future. Of this amount, BNDES is responsible for managing R\$250 billion. This policy includes six missions designed to grow and develop Brazilian industry, with one mission focusing on green industry, the energy transition, and sustainable cities. This mission specifically impacts the mining sector by promoting the production and diversification of critical and strategic minerals essential for the energy transition and global food security.

BNDES has launched a new fund to support critical and strategic minerals, particularly aimed at small and medium-sized enterprises in the mining sector. This fund was announced in May 2024 and is focused on financing projects related to mineral research, feasibility studies, and mine development. BNDES and Vale, both investing R\$250 million each, will be anchor investors of the fund. The goal is to raise an additional R\$500 million from other market investors.

### What are BNDES's goals and objectives for the coming year?

BNDES aims to triple its size in the coming years and significantly increase its support for projects across various sectors, with a focus on mining. The bank has set a goal to support more projects and allocate more resources, particularly in areas related to energy transition, decarbonization, and food security. For the first half of 2024, BNDES reported an 83% increase in approvals compared to the previous year, with a 157% growth in industrial projects. The bank is also enthusiastic about the Strategic Minerals Fund, which it believes will help identify high-quality, sustainable projects and support the diversification of Brazilian mineral production. ■

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inject over R\$300 billion into the Brazilian economy up to 2026, with the purpose of modernization, including the enhancement of manufacturing capabilities for EV makers, including Stellantis, which has announced investment plans of over R\$30 billion up to 2030. The mining sector will be crucial to this effort as a home-grown source of raw materials, from lithium to rare earths, maximizing value creation within the country.

For Appian Capital Advisory LLP, a leading private equity player in Brazil's mining industry with US\$3.6 billion of assets under management, and whose portfolio includes Atlantic Nickel, Mineração Vale Verde, Graphcoa and Omnigen Energy, the dearth of available capital for mining projects is being tackled head-on. Silvio Lima, head of corporate affairs, ESG and community engagement, said: "The inherent volatility of commodity prices makes securing financing for long-term projects difficult. Additionally, mining projects often have lengthy lifespans. This extended project cycle can deter potential investors seeking quicker returns."

The investment house, however, is bullish about the future of mining in Brazil. Lima continued: "The increasing demand for minerals essential for renewable energy technologies and electric vehicle batteries creates a unique opportunity for investors to support the green transition."

Conversations around the energy transition are changing the way the Brazilian mining sector operates, and despite the financing challenges, it could offer a solution to current pecuniary woes. Machado Meyer Advogados, a São Paulo-based legal firm with deep expertise in mining and cross-border investments and mining financing, is seeing the potential for a change in how traditional lenders approach mining investments in light of their importance for any energy transition scenario. Liliam Fernanda Yoshikawa, mining partner at Machado Meyer, said: "Interest in energy transition minerals will remain strong in the coming year. The government is likely to continue efforts to incentivize these projects. Locally, Brazilian banks are beginning to reconsider their stance on investment, recovering from past negative experiences."

Legal challenges for the industry remain, potentially hampering investment down the line. Questions around tax are the most polemic. IBRAM's figures indicate that in the first half of 2024, the mining sector contributed over R\$44.7 billion in taxes. Despite these figures, questions over introducing a selective tax could place an extra burden on mining activity. According to Frederico Bedran Oliveira, mining partner at Caputo, Bastos e Serra Advogados, a Brasília-based legal firm: "The ongoing debate about the selective tax and its impact on exports is a major concern. Legislative discussions around the mining code could disrupt the sector's stability."

Despite this potential headwind, there are more reasons to be optimistic, as the Brazilian authorities recognize the importance of seizing the moment regarding the mining industry and the role it could play globally. The government, which has strongly advocated for the energy industry, sees an overlap with the mining world.

According to Oliveira, public-private efforts are multiplying across the extractive sector, in financing arrangements, and also for nuclear energy: "With its significant uranium reserves, Brazil has enormous potential in this sector. In 2022, a legal framework was amended to allow public-private partnerships in uranium mining."

Caputo, Bastos e Serra Advogados has been expanding its energy practice alongside its mining focus to capitalize on and develop the increasing synergies between the two sectors. Oliveira mentioned how mining companies are increasingly engaging renewable energy providers to decarbonize their energy supply and that at the federal level, the government's launch of a National Policy for Energy Transition through the Ministry of Mines and Energy, supports them: "Notable regulatory developments include approving the new regulatory framework for green hydrogen, ongoing discussions about offshore wind energy, and legislative work on the future of low-carbon fuels." ■



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Michele Piovezani - Communications Manager  
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LY



PJ



## Liliam Fernanda Yoshikawa and Pedro Henrique Jardim

Mining Partners  
**MACHADO MEYER ADVOGADOS**

### Could you discuss recent developments in the mining sector in the past year?

PJ: Recently, we have been involved in significant operations, including substantial work with Vale. Some mining projects this year have been suspended or did not advance due to technical or commercial issues. This reflects a broader trend of slightly reduced foreign investment in Brazil, partly due to high domestic and international interest rates, impacting the appetite for new investments. There has been a shift from project financing to working capital, with fewer new, high-volume investments taking place. However, companies are still seeking resources for ongoing research and project development.

LFY: Brazilian banks are beginning to reconsider their stance on mining projects investments, recovering from past negative experiences. Additionally, there is an increase in interest from non-bank investors and funds in Brazil's mining sector.

### What are your expectations for the mining sector in Brazil for the upcoming year?

LY: We expect continued progress on energy transition projects and improvements in financing mechanisms. ■

### Can you update us on Mattos Filho Advogados' activities over the past year?

We have seen some significant project financing transactions, and companies are increasingly relying on alternative capital-raising methods, primarily through royalty transactions and, to a lesser extent, streaming transactions. In the past year, there have been numerous discussions in Brazil about mechanisms and incentives to create a culture and ecosystem of investment in the Brazilian market and in the mining sector. To make sense economically, this would involve tax advantages and benefits. Creating a new culture of investment in the stock exchange for the mining space requires these correct incentives and a cultural shift.

### What upcoming developments do you expect to observe in the sector?

Currently, BNDES is structuring a fund aimed at investing in critical minerals, particularly in exploration and development. BNDES will contribute 25% of the fund and is now seeking the remaining 75% from other investors. We are confident it will attract more investors to increase the fund's size. We expect to see more investors, particularly private equity, looking into mining opportunities. ■



## Adriano Trindade

Partner  
**MATTOS FILHO ADVOGADOS**



## Frederico Bedran Oliveira

Mining Partner  
**CAPUTO, BASTOS E SERRA ADVOGADOS**

### Can you share recent updates and developments at the firm since last year?

We have expanded our reach by adding professionals with high technical expertise to develop the mining, energy, oil, nuclear, and infrastructure sectors. Notable regulatory developments include approving the new regulatory framework for green hydrogen, ongoing discussions about offshore wind energy, and legislative work on the future of low-carbon fuels. These policies reflect a national shift towards a more sustainable energy matrix and regulatory alignment to support the energy and mining industries.

### What legal and regulatory challenges do you foresee for the Brazilian mining sector?

The ongoing debate about the selective tax and its impact on exports is a major concern. Legislative discussions around the mining code could disrupt the sector's stability. While the current mining code, dating back to 1967, provides legal certainty, any changes must be carefully managed to preserve stability. Another pressing issue is the need for stronger policies against illegal mining, particularly in the Amazon region, and improved traceability to ensure that all minerals meet legal and environmental standards. ■



## Power to the Miners

### Leveraging renewables for mining

Companies are looking to decarbonize their operations as the mining industry comes under greater scrutiny for its carbon emissions. Brazilian miners find themselves in a particularly good position on the energy front compared with international competitors. As the leader in renewable energy generation for electricity in the G20, with an over 90% share coming from wind, solar, and mostly hydropower, the country and the mining industry have laid a clear path to a greener future.

The renewable energy market is steadily drawing the attention of mining companies, and consulting companies are recognizing the importance of this transition for their clients. Roger Borges da Silva, regional manager of EBP Brasil, an environmental consulting firm that specializes in environmental remediation and energy transition efforts, said, "In Minas Gerais, for example, nearly all renewable solar energy projects are dedicated to supplying the mining sector directly. This clean energy does not even enter the national grid but is sold straight to mining companies."

Illian Energias Renováveis, a solar and wind energy company founded in 2021 and part of the Electra Group, is focusing its efforts on linking mining companies to renewable energy power supply, forming long term Power Purchase Agreements (PPAs) with customers. Guilherme Zimmer, commercial director at Illian Energias Renováveis, remarked: "The synergy between renewable energy and mining is growing stronger, particularly as mining companies are increasingly more sensitive to investors and ESG demands."

The country is blessed by geography regarding its potential renewable energy generation, evidenced by abundant hydropower capacity and sunlight for solar energy. Therefore, the challenges to the energy sector are man-made. Zimmer mentioned how struggles to upgrade energy infrastructure and ensure grid connection and transmission endure, and regulatory changes, including licensing backlogs, stymie the development of more projects. Nevertheless, renewable energy is the way forward for miners and brings commercial benefits, too. Zimmer continued: "When mining companies purchase renewable energy from renewable projects, such as solar or wind, they receive renewable energy certificates, which allow them to offset their carbon footprint and demonstrate their commitment to energy transition."

The workhorse of the Brazilian clean energy matrix remains hydropower. Brazil is the world's second-largest producer of hydroelectricity, according to the World Economic Forum. Data from the National Agency for Petroleum, Natural Gas and Biofuels suggest that natural gas imports in 2023 fell to their lowest level in 20 years, as hydropower generation supplied the country. Nevertheless, the hydropower sector remains vulnerable to droughts and requires significant investment to maintain and improve dams built decades ago. For example, construction for the Itaipu dam, the country's largest, began in 1971. If Brazil's ambitions for the mining sector are to be achieved and a green energy supply is maintained, investments will have to increase.

For Pimenta de Ávila, an engineering and consulting company specialising in geotechnical and water management solutions, the hydropower industry has also been of parallel importance to mining. One significant crossover is in dam safety, as tailings dams continue to be wound down



**Guilherme Zimmer,**  
Commercial Director,  
**ILLIAN ENERGIAS RENOVÁVEIS**

“Renewable energy offers mining companies an attractive, stable, long-term energy supply and pricing structure, which is crucial for controlling operational costs.”



and safety measures are implemented, the company has developed a digital tool, SYSDAM, to monitor dam safety data. Discussing the hydropower sector in Brazil, Joaquim Pimenta de Ávila, CEO, said: “There are challenges, such as environmental regulations that limit the expansion of reservoirs in hydropower projects. This restriction impacts energy production and can lead to increased reliance on thermal power during periods of low water availability, counteracting the benefits of cleaner energy sources.”

Renewable energy sources are vital for Brazil's electricity generation, supporting its sustainability goals and reducing dependency on fossil fuels. For mining companies, transitioning to cleaner energy is essential, as it enhances environmental responsibility. This shift is crucial to access financing and attract capital, meeting investor demands for sustainable, ethical practices.

The importance of hydropower for Brazil's energy mix is evident to Claudio Maia, CEO of Tractebel Latin America. The global engineering and consulting company has seen an uptick in demand for services related to environmental issues, as Maia suggests that the upcoming COP 30 in 2025, which will take place in Belém, is focusing the attention of mining clients on the importance of their green credentials. Maia said: “The hydropower sector in Brazil has seen no new construction for many years, with the last auction taking place 10-12 years ago. While the system may have some overcapacity, the country still needs new hydropower projects as a reliable energy source.”

The remoteness of many mining operations sometimes means companies must rely on something other than the national power grid. In this scenario, the role of fuel distributors, such as Petrobahia, is paramount. The company, which operates across 18 states in the country, has experienced rapid growth, doubling in size over the past two years.

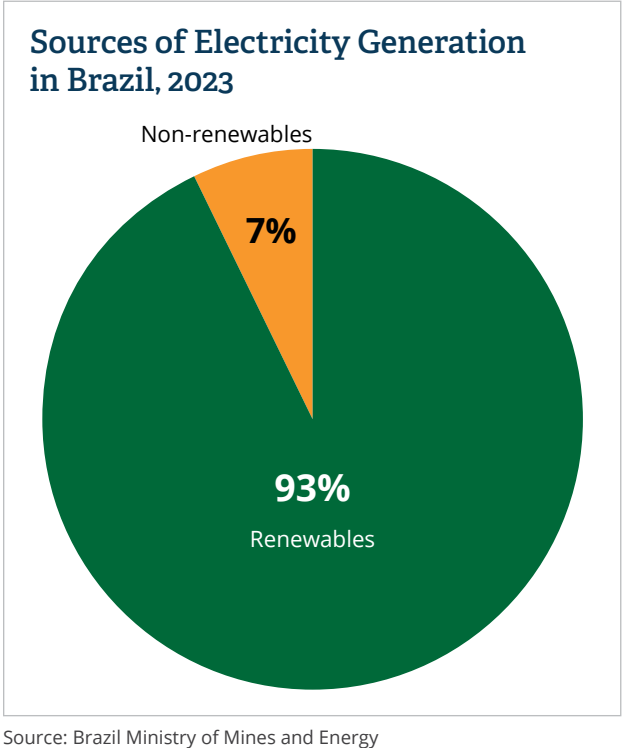
Petrobahia has turned its attention to the mining sector as an avenue for growth. Thiago Andrade, CEO of Petrobahia, said: “The mining and agribusiness sectors are our key focus areas, and we have firm contracts with various mining companies, including Ero Brasil and Aura Minerals.”

Petrobahia also invests in alternative fuel sources, recognizing their clients' demand for lower-emission energy supplies. In addition to its natural gas offering, which includes a gas pipeline network and investments of over R\$115 million to expand gas supply to Piauí and the northeast, Andrade said: “We are investing in a corn ethanol plant in Western Bahia, with the potential to produce biogas and even SAF (Sustainable Aviation Fuel). This is part of a broader strategy to invest in biofuels, which is a critical growth area for us.”

Brazil is a significant hub for Aggreko, a power generation and temperature control provider generating approximately US\$250 million in revenue, and with 400 megawatts installed in the country. The company has over 600 employees in Brazil but lacks a manufacturing center here. Brazil is also home to Aggreko's largest project worldwide, a diesel power generation contract in the Amazon region. Marco Contin, president of Aggreko Brazil, discussed the complexities of operating in that environment: “We undertook our first project in the Amazon, which involved sourcing equipment, acquiring land, and ensuring compliance with environmental standards. It is crucial to navigate land ownership complexities, where a single property can have multiple owners.”

Contin also discussed how privatization efforts in Brazil's energy sector have led to and encouraged more investments in infrastructure upgrades, leading to electrification rates of 70%, a remarkable metric given the scale and remoteness of much of the country, and a testament to the country's solid fundamentals for mining investments. Discussing the increasing sustainability commitments of companies across the sector, Contin said: “Four years ago, most of our business focused on diesel generation. Now, approximately 70-80% is shifting toward gas and renewable energy. We are currently looking at solar power projects in Brazil, aiming for substantial generation capacities.”

Another leading power provider for the mining industry is TSEA energia, a company that serves the power generation, transmission, distribution and industrial markets. Until 2018, it was Toshiba South America, when it was acquired by Brazilian private equity investors FRAM Capital following Toshiba's divestment from Brazil. TSEA energia has a large manufacturing footprint in the country, with factories in Contagem, Betim and Curitiba, serving various industries, from pulp and paper to mining. Regarding TSEA energia's exposure to mining operations, Rafael Porteiro, business development & marketing director said: “In recent years, we have seen significant growth in the lithium sector pushed by the EVs, particularly in the Vale do Jequitinhonha region, which has become a hub for lithium exploration, and it is in the same state that we have our operations, Minas Gerais. This has created new opportunities for us to supply equipment and services to companies in this sector.” ■



Source: Brazil Ministry of Mines and Energy



## Thiago Andrade

CEO  
PETROBAHIA

### What is Petrobahia's approach to the mining sector?

We offer a unique portfolio of services to the mining sector, enabling clients to purchase fuel directly from us with competitive pricing and high-quality service. As the 8th largest distributor by volume among over 150 distributors in Brazil, we expect to generate revenue of R\$10 billion in 2024.

### How does Petrobahia view the mining sector in Bahia state?

Bahia holds enormous potential in the mining sector, with expected investments of R\$18 to R\$19 billion over the next five years.

### What are the regulatory challenges facing the energy sector in Brazil?

Ongoing changes in taxation, carbon credits, and fuel quality regulations create uncertainty and can deter investment, especially in the gas sector.

### What is Petrobahia's focus on renewable energy?

We are investing in a corn ethanol plant in Western Bahia, with the potential to produce biogas and even Sustainable Aviation Fuel (SAF). As a vertically integrated fuel distributor, engaging in biofuels provides a competitive edge in the market. ■



## Rafael Porteiro

Business Development and  
Marketing Director  
TSEA ENERGIA

### Can you provide an overview of TSEA energia services for the mining sector?

Brazil is the one of the biggest mining countries in the world, and since mining business is an activity that demands a lot of energy, the available market for our equipment is very significant. The mining sector has always been a target-market for us. We have strong relationships with major mining companies in Brazil and we are closely aligned with their long-term expansion strategies. Over the time, we built a solid reputation by providing high-quality products for industrial applications as furnace transformers, compact substations solutions and others.

### How does TSEA energia incorporate sustainability and ESG principles into its operations?

We hold ISO 9001, 14001, 45001 and 14067 certifications and also monitor the carbon footprints for some of our products. Meeting ESG standards is not just client-driven but fundamental to our business ethos. We are committed to building a sustainable company that lasts for the next century, balancing environmental and social responsibilities with delivering reliable products and services. ■



## Marco Contin

President  
AGGREKO BRASIL

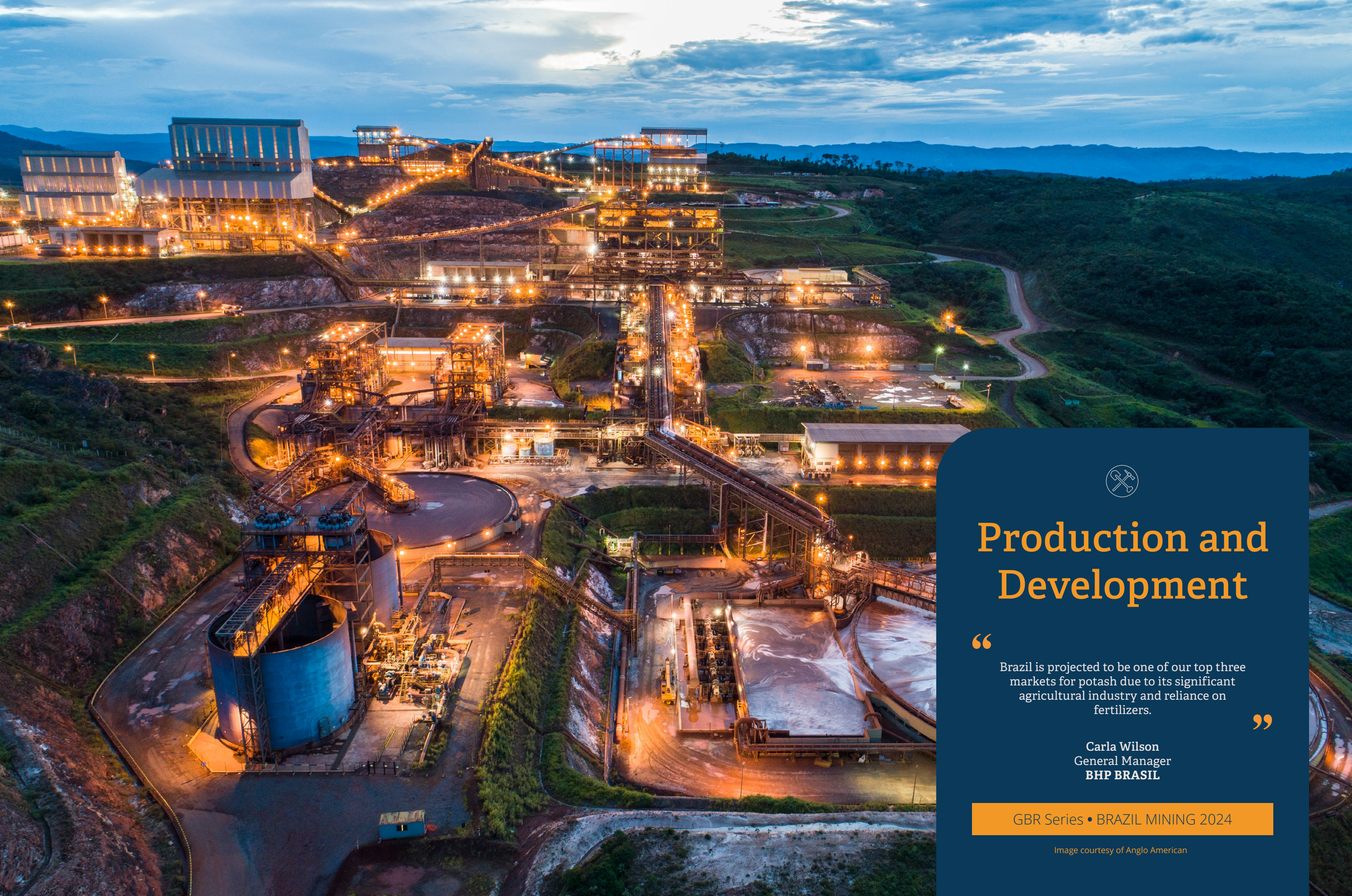
### Can you introduce us to Aggreko in Brazil?

Aggreko operates in Brazil with 400 megawatts installed. About 15% of this installed capacity is in the mining sector. Initially, Aggreko focused on transactional projects for industries, such as renting equipment. We shifted our focus to selling energy solutions, which became apparent in 2016 with the launch of our largest global project, involving diesel power generation plants in the Amazon region.

### Can you discuss your mining sector solutions and where you see the most demand?

Unlike the global trend where mining sites lack energy, around 90% of Brazil is connected to the energy grid. We support grid-connected mining operations by acting as a backup when they experience significant electrical issues. We also provide power during the construction of mining facilities. We are looking at fuels such as gas or hybrid solutions, including using solar power with batteries to reduce fuel consumption. Additionally, we offer temperature control solutions for deep mining operations, providing large air conditioning systems to help maintain productivity in extreme conditions. ■





# Production and Development

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Brazil is projected to be one of our top three markets for potash due to its significant agricultural industry and reliance on fertilizers.

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Carla Wilson  
General Manager  
**BHP BRASIL**

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Image courtesy of Anglo American



# Iron, Tin, Bauxite and Vanadium

## Mineral output in Brazil continues its upward trajectory

Iron production is the engine of Brazil's mining sector, dominating the industry by volume. The country's leading player, Vale, has achieved several milestones this year. Following 2023's achievements, when production increased by 29% yearly, 2024 has been no different. Its Q2 2024 figures point to an increase of 2.4%, or 80.6 million t/y, putting the company on track to reach its projected guidance figures of producing between 310 and 320 million t/y in 2024. Vale also reported reaching 100% renewable energy consumption this year. Vale is pursuing an international strategy of developing Mega Hubs worldwide, including in Saudi Arabia, establishing industrial complexes to manufacture low-carbon steel products and supply briquettes. In the lead-up to the Rio de Janeiro G20 summit this year, delegations from Saudi Arabia's Ministry of Mining have visited Vale facilities in the country. Vale completed its partnership with Saudi Arabia's Manara Minerals this year—a joint venture between Ma'aden, Saudi Arabia's state-owned mining company, and the Public Investment Fund—with Manara Minerals acquiring a 10% stake in Vale Base Metals Limited (VBM).

Samarco is continuing its journey of reconsolidation, and in 2023, approved a debt renegotiation deal and a R\$1.6 billion investment into the company's production process, increasing production capacity to 60% and constructing new filtration systems. Samarco is also investing heavily in its operational workforce and has plans to hire 600 direct employees. The company's total workforce, over 15,000 strong, now exceeds its pre-2015 levels. Samarco also reports that it has achieved 75% completion on the de-characterization project of the Fundão dam, one of Latin America's largest. Discussing Samarco's gradual recovery of production and operations, Rodrigo Vilela, Samarco's CEO, said: "In 2025, we aim to produce approximately 15 million t of pellets, which positions us as one of the second or third-largest exporters globally, a significant player as we were in the past. Our focus remains on completing this project, which is our primary expectation for 2025."

Discussing some of the technical and operational issues that Samarco is confronting as it continues to revamp its operations, Vilela said that finding use for the enormous volumes of waste material has been the company's princi-

pal difficulty: "The primary challenge is consolidating our operations while introducing new technologies, particularly finding uses for our waste materials. We are already constructing roads and pavements using these by-products."

Beyond Vale, there are new entrants to the iron industry, which include Lhg Mining, part of the J&F Group, the largest private conglomerate in Brazil. J&F Group acquired assets from Vale in 2022, including the Santa Cruz and Urucum mines in Mato Grosso do Sul. Its operations include a fully integrated supply chain, including river ports to transport material via barge through the Paraguay waterway to ports in Uruguay, particularly in Nueva Palmira. Discussing Lhg Mining's rapid adaptation and entrance to the market, Claudio Alves, director of new business, said: "Our 12-month investments since the acquisition include growing our team by 200%, recruiting senior leadership, and revamping processing systems to handle 12 million t/y, now aiming for 16 million t/y."

The company has been able to lean on the financial muscle of the J&F Group, investing heavily in updated processing systems, new fleets of equipment and qualified teams. Targeting European markets for export, Lhg Mining is producing high-grade lump ores and is depending on Europe's transition from high to low-emission industries, introducing carbon pricing and ESG sensitivity. Lhg Mining's growth has been explosive, but the company has encountered some bottlenecks. This year's principal challenge has been a drought in the region, impacting the river barge transportation system. As Alves explained: "Our main issue involves managing complex logistics in a remote region bordering Brazil and Bolivia. Our ore travels 2,500 km along a river route to reach a shallow water port, necessitating innovative solutions to streamline operations and lower costs."

3A Mining, an iron producer that operates in the same region, has an installed capacity of 1.5 million t/y and depends on the same transportation system as Lhg Mining. The drought has postponed 3A Mining's efforts to double production figures. Fabio Assumpção, mining operations, logistics & sales director, said: "Transportation constraints in Mato Grosso do Sul have been a challenge. The region has experienced a severe drought, hindering the transport

of materials from the Corumbá river port to the maritime port in Uruguay. As a result, we have limited our production capacities this year."

In Minas Gerais, the country's mining heartland, Belo Horizonte-based LGA Mineração e Siderurgia is an iron ore producer with a capacity of 2 million t/y at the Congonhas plant. The company, which supplies Vale, CSN and Gerdau, is currently in the engineering phase of increasing its capacity to 4.5 million t/y. Discussing how LGA has diversified its business by establishing commercial partnerships, Paulo Toledo, LGA Mineração e Siderurgia's CEO, said: "Before the Mariana accident in Brazil, we invested in equipment to treat our waste, specifically in 2015 when we established a collaboration with Jing-Jin, the largest manufacturer of filter presses globally. Today, we represent them in Brazil, supplying equipment for mining, waste treatment, water treatment, chemistry and fertilizers."

Brazil is also one of the world's leading tin producers. Mineração Taboca, which in 2008 became part of the Peruvian company Minsur, operates the Pitinga mine, a rich tin and tantalum mine located in the Amazon Region, and a tin smelter in Pirapora do Bom Jesus, near São Paulo. Mineração Taboca is the leading mining company in Amazonas, and Eduardo Orban, Mineração Taboca's CEO, discussed the unique operating environment: "We are adjacent to a biological reserve and two Indigenous communities; with one of them we have a long-term agreement to give access to our properties. Maintaining good relationships with these communities is crucial."

Mineração Taboca has invested heavily in its ESG credentials. Orban continued: "We have responsible mineral initiative certifications for our tin and tantalum smelters, controlling the entire supply chain from our mines to smelters. Taboca is ISO 9001, ISO 14001, and ISO 45001 certified. We follow ICMM sustainability requirements."

In Pará state, Mineração Rio do Norte (MRN), Brazil's biggest bauxite producer and exporter, is continuing work on the life extension of the East Zone, delivering the Front-End Loading phase on the mining project and transmission line. The company is also developing its West Zone bauxite project, which will supplement MRN's production and is expected to come online in 2028. Like Taboca, MRN operates in a sensitive environmental area and has focused its efforts on engaging with local Quilombo communities. A crucial element of this regards tailings dams, and MRN has imported specialized equipment from Australia to increase the solid content of tailings. Guido Germani, CEO of MRN, said: "We have focused on accelerating the tailings drying, leveraging the sun's natural drying power. We are also exploring remote operations for mining, mainly for the big dozers."

Largo Inc, which runs a vanadium operation located in Maracás in Bahia, is struggling with historically low vanadium prices. To manage volatility in the market, Daniel Tellechea, CEO of Largo, commented: "Largo currently operates with two main strategies: a short-term strategy focusing on navigating low commodity prices through efficiency and restructuring, and a long-term strategy aimed at increasing vanadium and ilmenite production." ■



Providing the Green Revolution  
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Mineração Taboca was founded in 1969 and operates in the mining and metallurgy of tin and industrial minerals. It is one of the few companies active in the world tin market to own its own mine, and the Pitinga Mine, located in the Amazon Region, is one of the richest in the world, with an estimated longevity of 100 years.



[www.mtaboca.com.br](http://www.mtaboca.com.br)





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Our top priority in Brazil remains ensuring the full and fair reparation of those affected by the Samarco dam failure.

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## Carla Wilson

General Manager  
BHP BRASIL

### Can you give us updates from BHP in Brazil since 2023?

BHP Brasil has maintained a strong focus on the reparation and compensation process following Samarco's Fundão tailings dam failure in 2015. More than R\$37 billion has been allocated towards financial compensation and reparation activities, and around half of this amount has gone directly to over 430,000 impacted individuals. The reparation efforts are vast and complex but progressing well. For example, the resettlements of Novo Bento Rodrigues and Paracatu are now in their final stages, with over 90% of the cases completed and more than 260 families living in their new homes, with water treatment stations, a health centre, a church, a football field.

Since December 2019, the impacted riverbanks and floodplains have been vegetated, river margins stabilised and in general, water quality and sediment qualities have returned to historic levels. On the operational side, Samarco has safely ramped up to 30% of its original production capacity. Samarco is in project execution to increase production capacity to 60% by early 2025.

### How does Brazil fit into BHP's global strategy?

In Brazil, Samarco produces high-quality iron ore pellets used for low-carbon steelmaking, which fits well with the global transition toward a low-carbon economy and is becoming more important as industries adopt greener technologies. Another major focus for BHP in Brazil is potash. We are developing the Jansen project in Canada, expected to be one of the largest potash mines in the world, critical for addressing the planet's growing food security needs. Brazil is projected to be one of our top three markets for potash due to its significant agricultural industry and reliance on fertilizers.

### Can you discuss BHP's sustainability and ESG philosophy?

Sustainability is integral to BHP's business strategy and long-term vision globally and in Brazil. Our Environmental, Social, and Governance (ESG) commitments are embedded in every facet of our operations. For example, social value goals are not just buzzwords; they are integrated into our capital allocation and decision-making processes. From a diversity and inclusion standpoint, BHP has made impressive strides in gender equality. Currently, 43% of employees and 40% of leaders in the Americas are women. This shift is crucial not just because

it is the right thing to do, but because we know that diverse and inclusive teams perform better, make better decisions, and have better safety outcomes.

We are committed to reducing operational greenhouse gas emissions (GHG) by 30% by FY2030 compared to FY2020 levels and achieving net-zero emissions by 2050. In FY2024, BHP reduced operational emissions by 32% since FY2020 baseline, primarily by increasing the use of renewable electricity. As a recent example, our BMA coal operations in Queensland, Australia, has just signed an agreement to be 100% powered by renewable energy by FY2027. Decarbonization is central to our strategy. Mining plays a crucial role in enabling the transition to cleaner energy. For example, copper is essential for wind turbines, solar panels, and electrical grids; nickel is essential for batteries in electric vehicles (EVs); and iron ore is needed for constructing new, sustainable infrastructure. Potash will be critical for sustainable agriculture and feeding the world's growing population.

### What are the priorities for BHP in Brazil and globally for the next year?

Our top priority in Brazil remains ensuring the full and fair reparation of those affected by the Samarco dam failure. This involves supporting the Renova Foundation to complete the resettlements, compensate individuals, as well as continue implementing long-term environmental monitoring and compensatory initiatives such as sanitation projects to further improve water quality in the Rio Doce. At the same time, we are committed to supporting Samarco to safely and sustainably ramp up operations. Globally, our focus is on potash development, particularly the Jansen project in Canada. This project is now 52% complete for its first phase, with the second phase being developed in parallel. Once fully operational by 2026/2027, the Jansen mine will become one of the world's largest potash producers. With its massive agricultural sector, Brazil is expected to be one of the top three consumers of our potash products, playing a crucial role in global food security. BHP will continue advancing its goals related to decarbonization, sustainable mining practices, and achieving net-zero emissions. ■

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Mining is one of the Brazilian economy's three main sectors and one with the greatest potential for growth in the next decade.

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## Ana Sanches

CEO  
ANGLO AMERICAN BRASIL



### Could you introduce us to Anglo American Brasil and your operations in the country?

Anglo American has been present in Brazil for more than 50 years, pursuing the purpose of reimagining mining to improve people's lives. Currently, the company has two principal businesses in the country: iron ore production in Conceição do Mato Dentro and Alvorada de Minas (MG) through the Minas-Rio System, which encompasses one of the largest mining pipelines in the world, 529 km long, passing through 33 municipalities between Minas Gerais and Rio de Janeiro, until filtering and export at the Porto do Açu (RJ); and ferronickel production in the state of Goiás, in the municipalities of Barro Alto and Niquelândia.

The pellet feed we produce in Minas-Rio is premium class, with a high iron content of around 41% and low levels of impurities. Our product is essential for decarbonizing the steel production chain, with low carbon emissions, contributing to reducing scope 3 emissions (indirect emissions in value chains) for the mining industry and beyond. Regarding the nickel business, where Anglo American's history in Brazil began, and our oldest operation, the main customer is the stainless-steel industry.

Together, Anglo American's projects in Brazil generate around 15,000 jobs, including their direct and indirect employment, in addition to investments of approximately R\$13 billion, which are expected between 2024 and 2028.

### Could you discuss Anglo American Brasil's ESG practices and commitments?

In line with our purpose of reimagining mining to improve people's lives, Anglo American seeks to delve deeper into ESG practices through its Sustainable Mining Plan. Our Sustainable Mining Plan guides the company's actions based on three pillars: Healthy Environment, Prosperous Communities and Trustworthy Corporate Leadership. With this plan, the company contributes to achieving the United Nations (UN) Sustainable Development Goals (SDGs).

The objectives of Anglo American's Sustainable Mining Plan include partnerships to improve the education and health systems of the communities that host its operations, generation of jobs disconnected from the mining value chain, strengthening transparency and integrity mechanisms, focus on reducing greenhouse gas emis-

sions in operational plants, efficient management of water resources used in mining, positive impact on biodiversity and safety and responsibility in operations, among many other topics.

As a highlight of these objectives, since 2022, 100% of Anglo American's electrical energy consumption in Brazil comes from certified renewable sources. Anglo American also has around 32,000 hectares of protected areas in Brazil, between the Cerrado and the Atlantic Forest, which represents more than six times its area operated in the country.

It is worth mentioning that in 2024, both the Minas-Rio iron ore complex and Barro Alto nickel projects received recognition of the IRMA standard, an acronym referring to the Responsible Mining Guarantee Initiative. Both operations achieved the IRMA 75 performance level, an unprecedented recognition worldwide for the iron ore and nickel businesses. To obtain this recognition, the two mines were evaluated by independent auditors who observed around 400 requirements, divided into four principles: business integrity, positive legacy, social responsibility, and environmental responsibility.

### What is your perspective on the state of the mining industry in Brazil and its trajectory?

Mining is one of the Brazilian economy's three main sectors and one with the greatest potential for growth in the next decade. It is a strategic activity for the country, responsible for a legacy of social and technological development and contributing to tax revenue and job creation.

In terms of the sector's challenges, we need to promote a consistent mineral policy that recognizes the activity's importance for the country's socioeconomic development. This includes, among other things, adequate financing and credit lines for the sector, a fair tax burden, greater geological knowledge of the mapped territory, and strengthening of the National Mining Agency (ANM) and other bodies responsible for the mineral industry.

In relation to the business, regardless of the forecasts that appear and price fluctuations in the commodities market, we need to focus on our responsibility, which is increasingly safe, responsible, efficient, and sustainable production and offering high-quality products to the market. ■





## Eduardo Orban

CEO  
MINERAÇÃO TABOCA

### Could you introduce us to Mineração Taboca?

Mineração Taboca was founded in 1969 and operates in the mining and metallurgy of tin and industrial minerals. It is one of the few companies active in the global tin market that owns its own mine, the Pitinga mine, located in the Amazon Region, which is one of the richest tin and tantalum mines in the world. In 2008 Taboca became part of the Peruvian company Minsur enhancing its technological and operational efficiency. Taboca operates two sites in Brazil, the mineral and metallurgical complex Pitinga in Presidente Figueiredo, Amazonas, and the tin smelter in Pirapora do Bom Jesus in the metropolitan region of São Paulo. Pitinga hosts a mine and beneficiation plant where concentrates are produced, along with a ferroalloy smelter for niobium and tantalum alloys production. Additionally, it has its own hydroelectric power plant for self-consumption. In Pirapora, the smelter processes the concentrate to produce high-grade metallic tin.

### What is the infrastructure and legal environment in Amazonas for mining?

Although Manaus has a very expressive industrial hub mainly due to the "Zona Franca" tax free area, the region is not really a mining area and Taboca is the largest mine operation in Amazonas State. Additionally, we are in a very remote area which gives

“Mineração Taboca's Pitinga mine, located in the Amazon region, is one of the richest tin and tantalum mines in the world.”

extra challenges to attract talents and suppliers for the region. Having its main activity in the middle of the forest and with Indigenous communities in our neighborhood involves extra caution in order to assure the highest standards of ESG and comply with all legislation and agreements we have with all stakeholders.

### Can you discuss the state of global tin markets and how they impact your operations?

The electrical transition, advances in artificial intelligence, 5G technologies, electrical vehicles among other are significant boosters for tin consumption alongside with tinplate applications also. Supply constraints can be a challenge because many of the major tin producing countries are facing regulatory, environmental and operational hurdles.

### How does Mineração Taboca incorporate ESG commitments in its operations?

We operate in a sensitive environmental context. We are adjacent to a biological reserve and two Indigenous communities. With one of them we have a long-term agreement to allow access to our properties. Maintaining good relationships with these communities is crucial. Overall, we have cultivated a positive relationship with the communities and the state, contributing to development and generating employ-

ment. We have responsible mineral initiative certifications for our tin and tantalum smelters, controlling the entire supply chain from our mines to smelters. Taboca is ISO 9001, ISO 14001, and ISO 45001 certified. We follow ICMM sustainability requirements. Our governance includes ethical practices, and we implement policies to support this. We are committed to the sustainable development of our activities and to fully complying with legislations and regulations applicable to our operations. We ensure the efficient use of natural resources, with special emphasis on the protection, respect and care of the environment, biodiversity and natural ecosystems in the company's areas of influence.

### What are Mineração Taboca's objectives for the coming year?

We have strong growth potential, with our operation supporting a mine life of several decades yet and, on top of it, we have still unexplored promising deposits to add additional mine life but, also, we have many other minerals in the existing deposit that are not yet being exploited. We could name for instance rare earth elements, hafnium, zircon and cryolite. For the next years, our focus is on cost controls and continuous improvement of the existing operations, further developments of what we call phase 3 project to improve final quality of our ferroalloys, and advance in our lab scale tests to produce rare earth concentrates. Pitinga has a massive potential to enter this market with preliminary studies showing a high quality and long-lasting resource of those materials with particular attention for the heavy elements. We developed a full potential study that will guide us for the best strategy for maximizing value from the asset for the future and will pursue that in the coming years. Furthermore, we remain resolute in our "Evolution" project, which aims to solidify our purpose of "Improving lives, transforming minerals into wellbeing". This initiative ensures a safe, healthy, inclusive, and holistic environment, consistently enhancing the wellbeing of our employees, partners, and surrounding communities. ■



## Rodrigo Vilela

CEO  
SAMARCO

“In 2025, we aim to produce approximately 15 million tons of pellets, which positions us as one of the largest exporters globally, as we were in the past.”

### Can you share the latest updates from Samarco in the past year?

We successfully consolidated our operations and completed 2023 without any environmental and safety incident and surpassed all our financial and safety goals for the year. One significant achievement was the renegotiation of our debt. In June 2023, we negotiated our debt while in judicial recovery. Today, we have an established payment plan, which is extremely important for the company's future. In the same year, we also approved an investment of over R\$1.6 billion to expand our production to 60% of capacity. That investment aims to expand our operations, adhering to our commitment to not operate with tailings dams and to construct new filtration systems. We initiated the project in 2023 and look forward to starting 2025 with a production capacity that has doubled. In 2025, we aim to produce approximately 15 million t of pellets, which positions us as one of the largest exporters globally, as we were in the past.

We utilize ore pipelines to transport concentrates from both of our processing plants. This has sustainability benefits, as we do not have to use trucks and consume fuel for transport.

### What progress has Samarco made in the de-characterization of tailings dams?

Our team is making substantial progress, achieving 75% completion on the de-characterization project. Last year, we completed the de-characterization of one of our dams. This entire process is conducted under strict oversight and audited by international organizations and local authorities to ensure

compliance with safety regulations. We have undertaken significant efforts to ensure the Germano dam is safely de-characterized and securely returned to the environment.

### Can you discuss the labor force expansion at Samarco?

We are expanding our operational workforce in Minas Gerais and Espírito Santo.

We hired around 600 direct employees in recent months. Last year, we initiated a comprehensive program called "Portas de Entrada," which focuses on training young individuals, particularly emphasizing gender and racial diversity in our workforce. In preparation, we opened vacancies for operators in advance, providing training courses in local communities. We have trained around 440 individuals and invested about R\$2 million in these programs. We increased the representation of women in our operations from around 7% to 15%, and overall female representation increased from 18% to 22% within a year. We now have around 15,000 employees, which exceeds our pre-2015 workforce numbers.

### What challenges does Samarco face in its operations?

The primary challenge is consolidating our operations while introducing new technologies, particularly finding uses for our waste materials. We are already constructing roads and pavements using these by-products, representing a significant challenge for the entire industry, not just Samarco. While we have secured the necessary licenses to operate at 60% capacity, obtaining licenses to reach 100% capacity remains a challenge. The licensing process in Brazil is

intricate and requires approvals from multiple regulatory bodies. But we are confident and dedicated for fulfilling all the steps of that licensing process.

### How does Samarco view global iron ore markets?

Our global iron ore market perspective is quite positive, particularly for high-quality minerals. We see a robust demand driven by global decarbonization initiatives and the need for reduced emissions from our clients, typically in the steel industry. Our customers have noticed a significant trend shifting toward using higher-grade iron ore. Given that we produce high-quality pellets, this shift presents an opportunity for us. Moreover, Brazil is well-positioned to supply products with significantly lower emissions than our competitors. Our production process utilizes clean energy, and our operations are designed to minimize emissions. Despite potential cyclical downturns due to geopolitical tensions and ongoing crises in various regions, the long-term fundamentals for our sector remain very promising.

### What are Samarco's future plans?

Over the next 12 months, we are optimistic about significant production growth. We are dedicated to playing a crucial role in the reparative processes for the damage caused by the collapse of the Fundão Dam. Over the past two years, we have participated in discussions with federal and state authorities and our shareholders to establish a process. We are very optimistic about the future and committed to responsibly advancing our operations while prioritizing sustainability and community engagement. ■



CA



PN



## Claudio Alves and Paulo Nogueira

CA: Director of New Business  
PN: Head of Marketing  
LHG MINING

### Can you introduce us to Lhg Mining?

PN: Lhg Mining is part of the J&F Group, the largest private conglomerate in Brazil. In July 2022, J&F acquired mining assets from Vale, including the Santa Cruz and Urucum mines, with high quality iron ore and manganese. This complex includes river ports for transporting materials via barge through the Paraguay waterway to ports in Uruguay.

Our investments since the acquisition include growing our team by 200% and revamping processing systems to handle 12 million t/y, now aiming for 16 million t/y. We increased the mobile fleet and logistics capabilities, enhancing waterway transport capacity with new barges and developing ports in Uruguay and Argentina. We are on track to exceed last year's production. We expect around 10 million t/y this year, aiming for 16 million t/y next year, with new processing plants to support this growth.

### What are the main drivers behind Lhg Mining's rapid growth?

CA: Our competitive edge lies in our significant reserves of high-grade iron ore, totaling 560 million tons with a minimum iron content of 62%. This enables us to produce premium ore exceeding 65% iron content, setting us apart in the market. We are conducting an extensive 80,000-meter drilling campaign to further expand these reserves by year-end.

### What specific challenges has Lhg Mining encountered as a new entrant in the mining sector?

CA: Our main challenge involves managing complex logistics in a remote region bordering Brazil and Bolivia. Our ore travels 2,500 km along a river route to reach a shallow water port, necessitating innovative solutions to streamline operations and lower costs. On the other hand, our main product is a high grade lump ore with excellent performance in the Blast Furnace, something unique in the market, with a premium that offsets the logistical challenges. ■

### Can you provide updates and recent news from Mineração Rio do Norte?

We are in an extraordinary moment at MRN regarding our mine life extension. In the last 22 months, we delivered the Front-End Loading phase on both the mining project and the transmission line. We have made significant progress in licensing, particularly by concluding interactions with local Quilombo communities. We have received sign offs from the social regulator, confirming that our project is sound and compliant with all social regulations. Licensing for the West Zone is ongoing, and we expect to obtain the necessary licenses by the end of August. This will allow us to move forward with the construction phase and increase our production capacity. We are targeting early 2028 to ramp up production.

### How are you managing waste and tailings dams?

We use innovative techniques to accelerate the drying process of tailings, transforming them into a brick-like material that is stable and easier to manage. This material can be safely disposed of in mined areas, covered with waste and soil, and then reforested to restore the natural landscape, which reduces the need for new tailings dams and minimizes our environmental footprint.

We are also exploring remote operations for mining, mainly for the big dozers. Additionally, we are in discussions with our Australian partners to remotely operate our mud master equipment, enhancing safety and operational efficiency. These innovations will improve productivity while reducing environmental impact and operational risks.

### What are your objectives and milestones for the next 12 to 24 months?

Key milestones include starting the transmission line by the end of this year and building roads to the new mines next year. Additionally, we will be finalizing geological work to extend the life of the current mine until the new projects come online. ■

## Guido Germani

CEO  
MINERAÇÃO RIO DO NORTE  
(MRN)



## Fabio Assumpção

Mining Operations, Logistics  
and Sales Director  
3A MINING

### Could you provide an update on 3A Mining's activities and recent developments?

We maintain an installed capacity of 1.5 million t/y with a processing plant that includes both a mobile unit and a fixed beneficiation unit. This setup supports both primary and secondary beneficiation. Recently, we obtained a new provisional utilization license with increased volume capacity. Our annual product production will be around 600,000 t/y, however, we anticipate securing a definitive license in the first quarter of next year, enabling us to operate at 1.5 to 3 million t/y. Transportation constraints in Mato Grosso do Sul have been a challenge. The region has experienced a severe drought, hindering the transport of materials from the Corumbá river port to the maritime port in Uruguay. Our primary market remains domestic, where our diversified product line caters to large, medium, and small blast furnaces.

Our product is expected to reach a grade of 64% iron content and offers additional benefits which minimize product degradation. Additionally, our product has a low phosphorus level.

### What are 3A Mining's main objectives for the upcoming year?

For the next year, our primary goal is to obtain the necessary license to expand the plant's production capacity to 3 million tons per year and solidify our position as a differentiated iron ore supplier in the region, focusing on niche markets both domestically and in Europe. We will continue to invest in ESG practices, as they are integral to our operations. We will proceed with the second investment phase once we have secured the necessary licenses and developed our client base. This phase will involve doubling our production capacity by adding mobile plants. Our fixed plant is designed to handle up to 3 million tons per year, so adding mobile units will support this expanded capacity. We will also enhance our infrastructure, including storage areas, electricity, and water supplies, to meet the increased demand. ■

### Can you introduce us to LGA Mineração e Siderurgia?

LGA Mineração e Siderurgia is part of a holding portfolio called PST Holding. Our base is in Belo Horizonte and Congonhas, and our plant is in Congonhas. We have two iron ore operations in Minas Gerais, with a capacity of 2 million t/y and another with 1 million t/y. Through PST Holding, we are developing and operating a magnesite mine in Bahia state, where we supply carbonite of magnesite to the agriculture and fertilizer sectors. We are also developing two mines in Pará state, with startup expected by the end of 2024. Our core business is mining, but we also invest in companies within the mining ecosystem, establishing pioneering commercial partnerships.

### Can you elaborate on your plant's location and its logistics?

We have established a strategic partnership with Gerdau and Vale, utilizing run-of-mine material from their mines. Our facility is located within 2 km of the Gerdau steel plant, the most significant facility regionally. We produce iron ore concentrate with an iron content of 64% and another with an iron content of 58%. Currently, LGA is investing in milling operations to transition our production into pellet feed, which is projected to begin in March 2025, allowing us to enhance the quality of our output.

### Can you discuss the process and challenges of increasing production capacity?

We are currently in the implementation phase of our project to increase capacity to 4.5 million t/y, and we have successfully obtained the necessary license for this expansion. However, the licensing process in Brazil poses significant challenges due to its bureaucratic nature, which can deter international investors. For instance, one of our operations took four years to secure a license for a relatively straightforward dry operation. Compared to countries like Australia, which produced at similar levels to Brazil a decade ago, they now produce three times more due to their more efficient licensing processes. ■

## Paulo Toledo

CEO  
LGA MINERAÇÃO E  
SIDERURGIA





Gold

Even at high gold prices, financing eludes gold juniors

Gold prices are reaching historic highs, and producers are reaping the benefits. Aura Minerals has since 2020 had Brazilian depository receipts, making it the first gold company listed in Brazil, in addition to its TSX listing. High prices have allowed Aura Minerals to deliver US\$170 million in value to shareholders through new dividends and share buybacks in the last three years. The company is targeting production of 450,000 oz/y by 2025. According to Rodrigo Barbosa, CEO of Aura Minerals: “We are focused on unlocking value in three areas: developing three Greenfield projects (Almas, Borborema and Matupá) on

time and on budget, significant investment in exploration, increasing our mineral resources and reserves, and growing through M&A.”

Aura Minerals' exploration efforts include the Serra da Estrela project in Carajás, Pará, a copper IOCG deposit that the company wants to develop into a copper mine. According to Barbosa, this development will contribute to Aura Minerals' diversified metals strategy, maintaining a balanced portfolio with 30-40% of revenue from copper and the rest from gold.

In Brazil's north, Canadian companies such as the TSX-V listed Bravo Mining are developing projects in Carajás. The exploration and development company is advancing its Luanga PGM+nickel deposit. Following a drilling and aerial mapping campaign and identification of anomalies, 17 high-priority targets for exploration were confirmed. Luis Azevedo, CEO of Bravo Mining, said: “T5 delivered the best yet copper-gold intercept of 2024 globally and top five over the last five years. The subsequent drilling on T5, hole 004, also ranked as the third-best intercept globally.”

Bravo Mining recently submitted environmental reports for the Luanga project. Azevedo said: “With clear evidence of mineralization at depths up to 450 m, Luanga's resource potential could feasibly double or triple, underpinning our long-term mine life projection of +20 years... Carajás represents a frontier mining region where significant deposits are still viable.”

Kinross, another major gold producer in the country, is riding the wave of high prices. The company produced 588,000 oz of gold in 2023, equivalent to 22% of Brazil's total gold production. Gilberto Azevedo, president of Kinross Brasil, commented: “For 2024, we hope to maintain the same level of production... In 2024, we project an approximate investment of US\$ 146 million.”

High gold prices have allowed the major gold producers in Brazil to fund expansion efforts within the country and elsewhere. In the case of Equinox Gold, for whom Brazil accounts for around 40% of its annual gold production, the company has completed construction and began production at its new Greenstone mine in Ontario this year. According to Greg Smith, Equinox Gold's CEO, the company has committed considerable financial resources to this project, and its Brazilian portfolio, which

in 2024 will contribute some 265,000 oz, has acted as an engine for this expansion. Turning the company's attention to Brazil, Smith said: “We are considering merging our Santa Luz and Fazenda mines into a single mining complex to maximize their potential and increase operating efficiencies,” adding: “At Aurizona, we are focusing on both surface and underground expansion opportunities. The primary expansion in Aurizona is underground. Although we had to delay the project slightly, we plan to start initial portal construction and decline into the ore body in 2025.”

Hochschild Mining, the Lima based LSE listed gold miner, has entered commercial production at its Mara Rosa mine, based in Goiás state. The company, which entered Brazil for the first time in 2022, plans to produce over 100,000 oz/y of gold for the first four years of production. Hochschild also recently signed an agreement with Cerrado Gold, giving the miner the option to purchase 100% interest in the Monte do Carmo gold project in Tocantins, covering 21 mineral concessions.


In Minas Gerais, Jaguar Mining, a gold producer listed on the TSX and with over 20 years of history operating in the region, is also riding the wave of high gold prices. Since 2017, the company has consistently produced over 70,000 oz/y of gold; looking to the future, it is investing the fruits of high prices to expand its portfolio. Marina Fagundes de Freitas, VP of finance and projects at Jaguar Mining, said: “We have directed most of these margins

towards new projects and are currently developing a new mine, Faina, near one of our existing complexes. We are already extracting some ounces from this site and anticipate achieving stable production in the next few years.”

Pará state is becoming a hub for gold mining. G Mining Ventures, the Canadian TSX listed gold producer, is also present in Tocantins. It entered Brazil in 2021, through the acquisition of the Tocantinzinho gold mine from Eldorado Gold. The mine poured gold for the first time in July 2024, and the feasibility study indicates a projected production of 175,000 oz/y of gold for the next 10 years.

Gold projects are advancing across the north, and the Pará state government's environmental agency has been busy working alongside mining companies trying to advance their projects in the region, including G Mining, Hochschild Mining, Ero Copper, and Aura Minerals. TriStar Gold, a TSX-V listed junior focused on developing its flagship gold Castelo de Sonhos project in Pará state, had its Preliminary License (LP) and Environmental Impact Assessment (EIA) approved this year. Nick Appleyard, TriStar Gold's president and CEO, discussed the attractiveness of Pará as a mining jurisdiction because of its geology and the state government's experience working with mining companies: “This makes the regulatory process smoother compared to regions where mining is less familiar. The history of mining in Pará means that the communities understand and support the economic benefits it brings.”


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**BRAVO.**  
MINING CORP.

**LUANGA PROJECT**

Multi-Million Ounce Tier 1 PGM + Au + Ni Deposit & High-Grade Copper-Gold Discovery in the World Class Carajás Mineral District, Brazil



Largest undeveloped PGM+Au+Ni deposit in the Americas




Substantial Mineral Resource growth potential

Significant Copper-Gold Discovery  
11.48m at 14.3% Cu, 3.3g/t Au and 8.75m at 9.48% Cu, 2.1g/t Au  
Ongoing testing of 17 Priority Targets

Prime Location in the world class Carajás Mineral District with paved road access to Project, abundant hydro power and water, rails, suppliers and local skilled labor

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# Hochschild Mining

Over 100 years of responsibility and innovation in the Americas.

Now also in Brazil, with our newest operation Mara Rosa!

Follow us on social media and stay up to date with the latest news about this new chapter in our history.

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**HOCHSCHILD**  
MAIS QUE MINERAÇÃO





## Rodrigo Nunes

COO  
HOCHSCHILD MINING

### Can you introduce Hochschild Mining and your presence in Brazil?

Hochschild Mining is a leading British-based silver and gold mining business operating in South America. It is headquartered in Lima, Peru, with a corporate office in London, and is listed on the London Stock Exchange. Hochschild Mining has a 100+ year history.

In Brazil, our Mara Rosa operation, which is located in Goiás state, is already operational after an on-time and on-budget construction process. We entered Brazil in 2022 through the acquisition of Amarillo Gold, and moved quickly to build the Mara Rosa project, with the first gold pour and commercial production announced in February and May of this year respectively.

The Mara Rosa project is a conventional open pit gold mine with a CIL processing plant with capacity of 7,000 t/d, and it has a life of mine average production of 80,000 Au oz/y.

Our project is situated in a mining-friendly jurisdiction in Goiás, and we are pleased with our relationship with the local community and the infrastructure we have developed in the region.

Our positive experience in Brazil has encouraged us to continue growing in the country. As a result, we recently signed an agreement to purchase 100% of the Monte do Carmo project in Tocantins with a land package covering 21 mineral concessions across 82,000 hectares. We are confident in the region's exploration po-

“  
Our positive experience in Brazil has encouraged us to continue growing in the country.  
”

tential and are currently conducting drilling and optimization engineering studies, with a decision on the project due by the first quarter of next year.

### What has been your experience with the state government and local infrastructure in Goiás?

The mayor and the state governor have been very supportive. The governor personally attended our foundational stone ceremony.

Since our acquisition announcement, the community has welcomed our development efforts. We have implemented ESG programs focusing on local employment and procurement, and over 37% of our workforce comes from the neighbor cities of Mara Rosa and Amaralina, and over 81% from the state of Goiás.

### Why has Hochschild Mining chosen to focus on Brazil for future growth?

Brazil offers a robust institutional and regulatory framework that is attractive to international investors. The mining sector is well-regulated, local governments are supportive, and communities welcome responsible mining operations. Furthermore, the quality of the Brazilian workforce is outstanding and enables efficient project builds.

### What are the main challenges you foresee operating in the country?

The main challenges in Brazil are related to macroeconomic factors, par-

ticularly the volatility of the Brazilian Real and inflation. While these factors are currently offset due to high precious metals prices, we are cautious about future fluctuations. Additionally, the current Brazilian tax system is complex, and we are monitoring the advancement of the new tax schemes that could impact the mining industry. From an operational standpoint, we focus on maintaining efficiency regardless of metal prices.

### What are Hochschild Mining's ESG commitments in Brazil?

Our robust ESG initiatives have been in place since before we started our operations. I will outline four of our key initiatives: Firstly, attracting talent and the training of local manpower; hundreds of people have participated in our training programs and now work with us as part of our local workforce.

As a second initiative, we have created an open space for educational visits and have received visits from thousands of students eager to learn about mining. This initiative received the 2023 Sustainable Goiás award from the local environmental agency.

Third and very importantly, through our constant employee safety efforts we have been able to complete over 5 million working hours without lost-time injuries.

Finally, we have invested in preserving a local state park, contributing to the region's environmental conservation.

### What are your objectives for the next 12 months in Brazil?

Over the next 12 months, our primary objective is to ensure a strong operational performance at the Mara Rosa project. We will continue to establish the highest mining standards and practices for this new operation, leveraging over 100 years of experience.

Our second objective is to advance the exploration and engineering optimization plans for Monte do Carmo as we aim to make an informed decision about developing this project by the first quarter of next year. Growing in Brazil is a significant strategic priority, and we are well underway to achieving it. ■



## Ricardo Gilberto Azevedo

President  
KINROSS BRASIL

### Could you update us on Kinross Brasil's recent activities?

Our operation in Paracatu, where we have operations in gold research, extraction and processing, makes us the leading gold producer in the country. In step with our Industry 4.0 commitments to autonomous operations, we have introduced Pit Viper 271 drills to our fleet, making us pioneers in Brazil in this technology, as we made a significant leap in the increase in processed material.

In 2023, we produced 588,000 oz of gold, equivalent to 22% of the national total. In terms of production, the Morro Ouro mine already has a high production capacity. We also have a presence in the state of Goiás, where the company has two hydroelectric plants, Caçu and Barra dos Coqueiros, with capacities of 65 MW and 90 MW, which provide much of the energy needs for our operation in Paracatu.

### How is Kinross Brasil strengthening community relations and ESG commitments in Paracatu?

Our Paracatu 2030 Plan focuses on crucial areas such as education, environment, culture, job, and income generation. The Integrar Program, our main socio-environmental investment platform, covers essential areas, such as culture, job and income generation, education and environmental education. Since its creation in 2011, we have invested around R\$30 million in this program, benefiting approximately 60,000 people.

Additionally, we adopted initiatives such as optimizing the fleet of 793 off-road trucks and replacing two loaders with diesel engines with electric models. With this, we avoided almost 12,000 t of CO2 emission. ■



## Rodrigo Barbosa

CEO  
AURA MINERALS

### Can you update us on Aura Minerals' recent developments?

We completed the construction of Almas on time and within budget in 2023. We also finalized the acquisition of Borborema and secured over US\$100 million in funding, along with close to US\$40 million from royalties and gold loans. Construction of Borborema is underway and is now more than 30% complete. Additionally, we have advanced our Matupá project and acquired two new exploration rights in the vicinity, which could increase our resources by over 1 million oz, pending results from the drilling program approved for the next 12 months. Lastly, our exploration efforts at the early-stage Serra da Estrela project in Carajás, a copper IOCG deposit, show promising results.

### What are Aura Minerals' plans and milestones for the next year?

Our milestones are clear: finish the construction of Borborema, start the construction of Matupá, continue with our exploration program, make significant progress in Serra da Estrela Carajás, and continue to look for M&A opportunities to push our production above 450,000 oz towards 1 million oz. ■



## Greg Smith

CEO  
EQUINOX GOLD

### Can you discuss recent developments in your Brazilian portfolio?

In Brazil, we operate Aurizona in Maranhão, Santa Luz and Fazenda in Bahia, and RDM in Minas Gerais. In 2024, these mines are expected to produce around 265,000 oz/y of gold, which is lower than usual due to various challenges. At Aurizona, instability in our Piaba pit wall required shifting to a new pit, Tatajuba, causing a temporary setback. We aim to increase output from our four Brazil mines to around 300,000 oz next year. Brazil is important to us, constituting about 40% of our annual production.

### How do you view Brazil as a mining jurisdiction?

Brazil remains favorable due to its strong mining culture, skilled labor and a supportive government. The shift to dry stack tailings aligns with Brazil's focus on responsible mining practices, but the transition has also extended RDM's mine life so it's beneficial on both sides. The country offers good potential for significant gold deposits and we remain open to expanding in Brazil if the right opportunities arise. ■





## Louis-Pierre Gignac

CEO  
G MINING VENTURES

### Can you introduce us to G Mining Ventures?

G Mining Ventures was founded in October 2020, focusing on acquiring and developing mining assets, particularly in gold. In 2021, the company acquired the Tocantinzinho project from Eldorado Gold, a significant transaction that positioned it for rapid development due to its shovel-ready status. By February 2022, we completed a feasibility study demonstrating the project's viability, and construction commenced in July 2022. As of mid-2024, the mine is on track to become one of Brazil's largest gold producers, with anticipated annual outputs of approximately 175,000 oz/y. To finance the Tocantinzinho mine's construction, we successfully raised US\$481 million. Notably, Franco-Nevada, a significant player in the mining financing space, played a key role in this funding round, highlighting confidence in the project's potential. On September 3rd, we announced commercial production at Tocantinzinho, and anticipate ramping up to full nameplate capacity by the end of this year.

### Can you discuss the Tocantinzinho mine's location and potential?

The state of Pará is emerging as a hub for Canadian mining companies. The increasing investment in Brazilian mining reflects its strategic importance and potential for future growth. The project required significant infrastructure investment, including constructing a 198-km transmission line

“The state of Pará is emerging as a hub for Canadian mining companies.”

to connect the mine to Brazil's national power grid.

The feasibility study indicates an average production of approximately 175,000 oz/y over a mine life projected at 10.5 years. In the initial years, the mine will achieve higher outputs, aiming to produce close to 200,000 oz/y during the first three full years of operation. The mine successfully processed its first ore on June 10, 2024, with the first gold production reported on July 9, marking a significant milestone for G Mining Ventures.

### Can you elaborate on the company's social initiatives and ESG commitments?

Key initiatives include upgrading local infrastructure, such as improving a police station and constructing bypass roads to alleviate traffic in nearby towns. The company also invested in educational facilities, providing Wi-Fi access to local schools to enhance connectivity. A notable investment was the development of a modern camp facility for workers, which includes amenities such as air conditioning, recreational areas, and fiber optic internet for better communication.

We operate an owner-mining model to maintain direct control over our operations and ensure that the company's team develops long-term expertise. This approach allows for better management of the mining process, including recruiting skilled labor and fostering a culture of safety and efficiency. G Mining Ventures has made concerted

efforts to hire female operators, aiming to diversify its workforce and create an inclusive work environment.

### Can you discuss the company's new project and exploration pipeline?

We have made a strategic acquisition in Guyana, which is a fast-track opportunity for expansion and will complement the operations at Tocantinzinho. The company plans to initiate construction at the Oko West project next year and wants to transfer equipment and personnel from Tocantinzinho to support the new venture. The Guyana project has an expected production capacity of around 350,000 oz/y of gold, positioning G Mining Ventures for substantial growth and further diversification of its operations.

Given current market conditions we are poised to benefit significantly from increased cash flow. This robust financial position allows the company to support ongoing operations at Tocantinzinho and finance further developments at the Oko West project in Guyana and increase its exploration activities to discover additional gold resources. This year, we have allocated US\$4 million for exploration efforts, intending to ramp up spending in the following year. The company has identified 19 exploration targets across a vast land package of 996 km surrounding the Tocantinzinho project. The immediate focus will be on a 5-km radius around the processing plant, strategically chosen to optimize potential discoveries and enhance the resource base to support ongoing operations.

### What are your outlook and goals for 2024 and 2025?

For 2024, we aim to achieve nameplate capacity at our Tocantinzinho mine, focusing on ramping up output and operational efficiency. In terms of growth, the company plans to advance the Oko West project in Guyana, building on the publication of a PEA in September 2024. Additionally, the company intends to file the Environmental and Social Impact Assessment with the Guyanese government later this year, a critical step toward commencing construction on the new project and expanding the company's operational footprint. ■

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Community engagement has been a critical focus for the company, ensuring the Castelo de Sonhos project has both regulatory and social support moving forward. Appleyard said: "After submitting the EIA, the Pará State Environmental Council (COEMA) reviewed it, conducted a site visit, and held a public hearing or town hall meeting. This meeting allows everyone to have their say. Our recent meeting had about 600 attendees and was very successful, showing strong community and state support."

Another TSX-V listed gold developer in the state of Pará is Cabral Gold, advancing its pre-feasibility study at the company's Cuiú Cuiú project. Cabral Gold announced drilling results cutting 11 m at 33 g/t of gold at its Machichie NE target and has hired a new VP of exploration, Brian Arkel. The state, which is famous for its iron ore mining, is becoming a gold destination. Alan Carter, CEO of Cabral Gold, mentioned: "Large scale gold mining is relatively new to this part of Brazil, which is surprising as it was the site of the world's largest-ever gold rush in the 1980s, with estimates of over a million people recovering 20-30 million oz of gold in its rivers, all through informal mining."

Gold mining in the state occurs in remote areas, and infrastructure and access present challenges for players across the board. Despite this, Carter from Cabral Gold, is optimistic about the region's development: "The paving of BR-163, a major north-south federal highway, and the installation of a 190 km power line to bring grid power within 20 km of our site, are notable recent improvements in infrastructure."

Just across the state border in Matto Grosso, Altamira Gold, a TSX-V gold developer, is working on its flagship Cajueiro project, which straddles the border between Pará and Matto Grosso. In 2019, the company filed a 43-101 compliant resource of 700,000 oz gold for it. More recently, drilling efforts from Maria Bonita, a gold-in-soil anomaly, made a historic discovery: one of Brazil's first gold porphyry systems. Discussing this development, Mi-

chael Bennett, president and CEO of Altamira Gold, said: "We are now diligently working to determine the extent of the gold mineralization at Maria Bonita and exploring other areas within our 30,000-hectare claim block for similar deposits."

Junior companies need help attracting long term financial commitments and investments in their projects, regardless of their promise. Access to capital remains an issue, and dilution is a significant concern for junior companies. Altamira Gold has developed a cashflow strategy through small-scale production to mitigate these challenges, as Bennett explained: "With good metallurgy, excellent access, cheap hydro-electric power and the potential for multiple significant discoveries within our 30,000-hectare claim block, we aim to provide substantial value to our shareholders through small-scale production and subsequent exploration funding." ■



Marina Fagundes de Freitas  
VP of Finance and Projects  
JAGUAR MINING

“In Q2 2024, our financial performance was robust, with a significant margin generated due to the increase in gold prices and favorable foreign exchange rates.”

**BUILDING THE NEXT LEADING  
INTERMEDIATE GOLD PRODUCER  
THROUGH FLAWLESS PROJECT EXECUTION**

- Tocantinzinho Gold Mine declared commercial production in September 2024
- Oko West Gold Project PEA published in October 2024
- Anticipated to produce over 500,000 ounces p.a. by 2028

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## Luis Azevedo

CEO  
BRAVO MINING

### Can you provide updates on Bravo Mining's recent activities?

In 2024, we have achieved significant milestones at Bravo Mining and have made substantial discoveries in copper and gold, beyond the continued success we are having drilling the PGM+Nickel deposit. In August 2022, we identified a massive sulfide deposit during our PGM drilling efforts. This discovery prompted us to initiate an extensive electromagnetic survey program to pinpoint additional mineralization hotspots. In June last year, we secured the necessary equipment for this survey and conducted a comprehensive aerial survey covering 700 lines across the total of our project area. In February this year we completed the data reprocessing phase, identifying 36 anomalies. From these, we selected 17 high-priority targets for further exploration. Remarkably, our initial drilling efforts on anomalies T5, T6, and T16 yielded promising results. T5 delivered the best yet copper-gold intercept of 2024 globally and top five over the last five years. The subsequent drilling on T5, hole 004, also ranked as the third-best intercept globally. We are revisiting these sites with ground-based electromagnetic surveys to pinpoint the exact sources of these anomalies. We hope to share further positive news regarding our copper projects in the coming months. We plan to expand our drilling activities beyond the 17 selected priority anomalies, encompassing all 36 identified targets soon.

“Carajás represents a frontier mining region where significant deposits are still viable, and we have already identified considerable mineralization, hinting at potentially groundbreaking discoveries.”

### Why should mining investors take an interest in Bravo Mining?

Investors are attracted to Bravo Mining for several compelling reasons. Our projects offer substantial scale and potential, particularly in the already established PGM deposit, which continues to grow, and the recently unveiled copper-gold discovery. Carajás represents a frontier mining region where significant deposits are still viable, and we have already identified considerable mineralization, hinting at potentially groundbreaking discoveries. Our region also hosts other significant deposits in various development stages, positioning Bravo Mining as a potential next major player. We recently submitted our environmental reports, marking substantial progress in de-risking our operations, which should translate into positive shareholder outcomes in the coming months.

### What makes the Luanga project stand out?

Our projects stand out due to its diversified commodity portfolio and scale. We have conducted extensive drilling, exceeding 125,000 m, with plans to update our resource estimates soon, bolstering confidence in our resource base. We estimate to add more tonnage to our current 9.8 million t of resources between indicated and inferred categories, with an additional 20,000 m of drilling completed and another 10,000 m planned this year. This ongoing exploration has excited the market, particularly with the discov-

ery of 36 anomalies around Luanga, where early drilling has yielded promising results in three of these targets alone. This indicates the potential for a significant PGM deposit and lucrative copper-gold prospects. Luanga presents a compelling case for open pit mining due to its shallow mineral deposits, reaching a maximum depth of approximately 300 m. With clear evidence of mineralization at depths up to 450 m, Luanga's resource potential could feasibly double or triple, underpinning our long-term mine life projection of +20 years. Such high-grade discoveries make our project economically viable and have contributed to Bravo Mining's impressive market performance post-IPO, currently standing over 100% above our IPO price.

### Why is Brazil a favorable jurisdiction for Bravo Mining?

Brazil remains a favorable jurisdiction for mining activities due to its supportive regulatory environment, with solid governmental and community backing. We have received overwhelming support from local communities and authorities alike. Our commitment to sustainable mining practices is evidenced by our initiatives, such as planting 30,000 fruit trees and supporting local communities. These efforts strengthen our relationships with stakeholders and contribute to the region's socio-economic development. Moreover, Brazil's geological richness enhances our operational advantages and underscores our confidence in the longevity and profitability of our projects.

### What are Bravo Mining's plans for the next year?

Our plans for the next year revolve around advancing our permitting processes. We are also poised to expand our drilling activities significantly, aiming to accelerate the resource update and follow up on our significant copper-gold discovery. Our focus will remain on de-risking our projects through comprehensive metallurgical studies, not only for our PGM deposits but also for our burgeoning copper and gold projects. This proactive approach should keep building momentum and delivering substantial value to our shareholders and stakeholders. ■



## Michael Bennett

President and CEO  
ALTAMIRA GOLD

### Can you update us on Altamira Gold's activities since 2023?

Since last year, Altamira Gold has focused on exploring a new area within our flagship project Cajueiro in the state of Mato Grosso in Brazil. In 2019, we published a 43-101 compliant resource of 700,000-oz gold in the central area within a much larger claim block where we knew there were also several other gold-in-soil anomalies. One of these anomalies, Mario Bonita, which had some preliminary drilling, has proven significant. Continued drilling at Mario Bonita revealed one of Brazil's first gold porphyry systems.

We are now diligently working to determine the extent of the gold mineralization at Maria Bonita and exploring other areas within our 30,000-hectare claim block for similar deposits. We have used an in-house drone magnetic survey to understand the underlying geology and structural controls better and have identified low magnetic responses corresponding to mineralized zones. This method has been applied to our other projects, including Apiacas, revealing new drilling targets. We also have Santa Helena, a project more oriented towards copper, with three walk-in drill targets showing copper in soils. These targets align with structural trends that suggests significant potential for a copper porphyry system.

### What are the main financing challenges for junior mining companies?

Raising money has been difficult for junior mining companies over the past five years. Dilution is a concern, so the non-dilutive way to finance the company is through small-scale production, which not all companies can achieve. Our mining concessions have been converted from exploration to the mining stage, removing the pressure of tight timelines. With good metallurgy, excellent access, cheap hydro-electric power and the potential for multiple significant discoveries, we aim to provide substantial value to our shareholders through small-scale production and subsequent exploration funding. In the next 12-18 months, we aim to advance towards small-scale mining at Cajueiro. ■

### Can you update us on Tristar Gold and recent developments?

We are developing the Castelo de Sonhos project on the southern border of Pará. We completed a pre-feasibility study in late 2021 and submitted the EIA and Preliminary License (LP) application in July 2022. After submitting the EIA, the Pará State Environmental Council (COEMA) reviewed it, conducted a site visit, and held a public hearing or town hall meeting. This meeting allows everyone to have their say. Our recent meeting had about 600 attendees and was very successful, showing strong community and state support.

### What is the significance of this approval for TriStar Gold?

As a single-asset company, this approval is crucial. With the social license and community support, we are now a standout company in the junior mining development sector. The following steps involve moving towards building the mine whilst maintaining strong community and state support. Due to market conditions, we have been cautious with spending and have prioritized executing the permitting process well. We have a great asset, and we want to move into a mid-tier gold mine as soon as possible without distractions.

### Why is Brazil an attractive mining jurisdiction from a regulatory and geological standpoint?

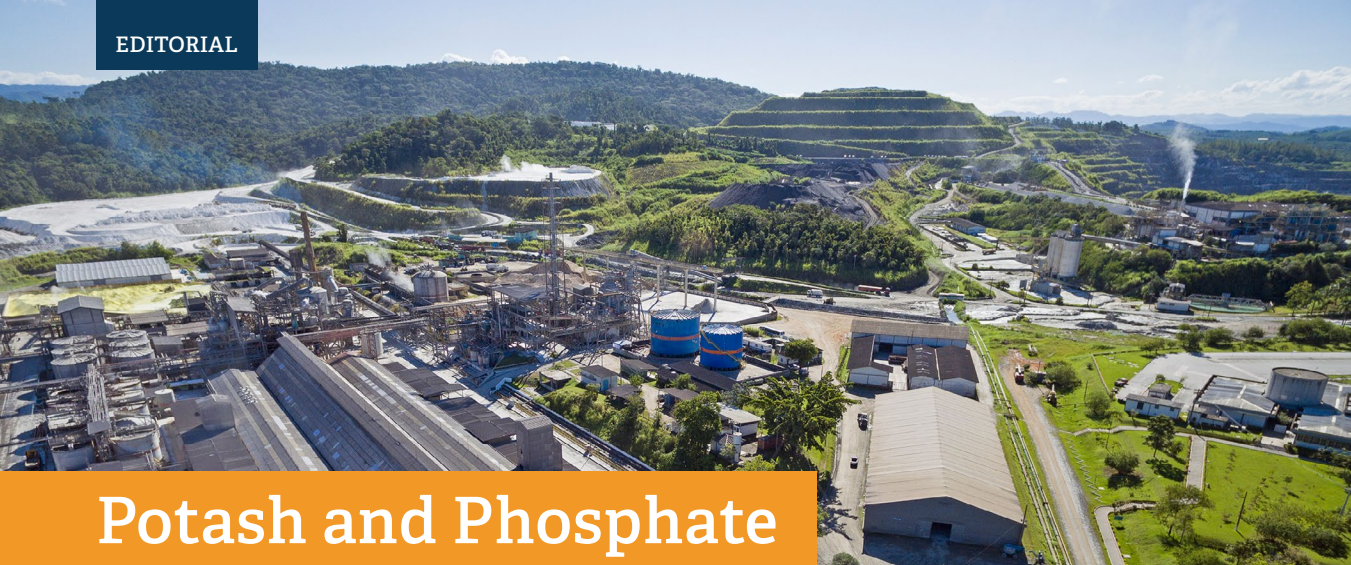
Pará has excellent geological potential; where we are working it is geologically similar to Western Africa. Culturally, mining is understood and accepted by the local population and government. This makes the regulatory process smoother compared to regions where mining is less familiar. The history of mining in Pará means that the communities understand and support the economic benefits it brings. Development activity in Brazil has increased recently with several projects, including those by G Mining, Hochschild Mining, Ero Copper, and Aura Minerals, are moving ahead successfully. These projects are generally on schedule, and on budget, reinforcing Brazil as an excellent place to invest the capital to build a mine. ■



## Nick Appleyard

President and CEO  
TRISTAR GOLD





# Potash and Phosphate

## Mining for Brazil's food security

Alongside mining, another pillar of Brazilian exports is the agricultural industry. Brazilian agricultural exports continue to surge yearly; agricultural activity grew over 15% between 2022 and 2023, according to the Brazilian Institute for Geography and Statistics. Food security is a cornerstone of Brazilian government policy. Alongside it's booming agricultural export business, providing for Brazil's population, which according to the Brazilian Institute of Geography and Statistics (IBGE), reached 212.6 million people in July of 2024, is equally important. The country has made significant progress eliminating food insecurity; the U.N.'s *State of Food Security and Nutrition in the World* report, stated that in 2023, severe food insecurity dropped over 85% in 2023. Being able to secure domestic production for consumption and export is key.

Producers in Russia, Belarus and Canada dominate the global fertilizer market. The continuing war in Ukraine has since 2022 thrown into question the reliance on Russian and Belorussian inputs for crucial fertilizers. In the immediate aftermath of the Russian invasion of Ukraine, global fertilizer prices skyrocketed. Though prices have stabilized since, the war is an ongoing source of insecurity in this market and is forcing countries and companies to look elsewhere. To highlight just how globally significant the Brazilian fertilizer market is, and will continue to be, major mining companies such as BHP are venturing into the potash market. Discussing BHP's foray into this crucial sector and the importance of Brazil, Carla Wilson, general manager of BHP Brasil, said: "Globally, our focus is on potash development, particularly the Jansen project in Canada. This project is now 52% complete for its first phase, with the second phase being developed in parallel. Once fully operational by 2026/2027, the Jansen mine will become one of the world's largest potash producers. With its massive agricultural sector, Brazil is expected to be one of the top three consumers of our potash products, playing a crucial role in global food security."

As this sector continues to grow, the country's reliance on foreign imports of potassium and phosphate, crucial for fertilizer products, becomes an increasing risk, and mining companies are delivering projects to confront this shortfall and secure Brazil's strategic autonomy and food security. One such example is Potássio do Brasil,

which is developing its flagship Autazes project, which seeks to produce 2.2 million t/y of potassium, equivalent to 17% of Brazil's consumption, once completed. Over the past year, Potássio do Brasil has accomplished notable milestones, including approval of the Autazes project's implementation license. Discussing the importance of securing domestic production for the country, Adriano Espescht, CEO of Potássio do Brasil, said: "The concentration of potassium production among a few countries poses a potential risk to global supply chains and, in turn, global food security. Our project aims to significantly contribute to Brazil's agricultural sector by reducing dependency on imported potassium and ensuring a stable supply of fertilizers." Espescht continued: "Over the next 12 months, our primary focus will be on advancing key construction milestones, including the development of two 930-meter-deep shafts and essential infrastructure such as the mining plant, access roads, and port facilities."

Morro Verde is an established producer in the fertilizer industry, producing limestone, phosphate and magnesium, and is based in Pratápolis. Caíque Souza, Morro Verde's, CEO, said: "Our goal for 2024 is to produce 600,000 t of phosphate and limestone, with a target of reaching 1.5 million t/y within a few years."

Souza also commented on the difficulties raising money for capital projects in the mining industry and highlighted the role that private equity is playing in Brazil's mining scene, as Morro Verde recently received substantial investments from Ore Investments, a Brazilian mining-focused investment house: "We need a low capital-cost environment to attract investors. Once a resource is discovered, we still require capital to develop it, which is challenging in a high-interest environment."

The Mosaic Company, Brazil's largest fertilizer company that mines phosphate and potash in Brazil and North America, has recently launched a new bioscience division in Brazil, focused on bio-nutrition, and is investing heavily in the country's agricultural sector. Nancy Case, vice president of operations and technical services at Mosaic, commented: "The company has made much progress on our blending unit project in Tocantins, a R\$400 million investment." ■



**Nancy Case**

VP Operations and Technical  
Services  
**THE MOSAIC COMPANY**

### Could you give us some updates from Mosaic in Brazil?

We have made much progress on our blending unit project in Tocantins, with plans for it to be operational in 2025. This year Mosaic also announced the launch of our Biosciences platform in Brazil. This move positions Mosaic to become a leading bio-nutrition company with science-backed products that address the interaction between the soil and plants. We are continuing work on our MRE 60 project, which focuses on mass recovery improvements. This project has enormous cost and productivity gains and has a sustainability component, as it uses minerals in a sustainable manner and reduces waste sent to tailings facilities.

### What are some general challenges Mosaic encounters operating in Brazil?

Compared to our North American operations, Brazil has a few different challenges regarding the potash reserves' temperatures and depth. The phosphate reserves differ significantly, presenting unique challenges in both mining and concentration processes. Brazil has more challenges affecting cost and productivity. Other challenges include different tax structures, sometimes higher taxes on imported equipment, and logistics issues, as most transportation happens via roads rather than rail. Workforce availability has also been a challenge. ■



**Caíque Souza**

CEO  
**MORRO VERDE**

### Can you introduce us to Morro Verde and its history?

Morro Verde is a company focused on producing natural fertilizers. We currently produce phosphate and dolomitic limestone, with potential operations in other minerals and nutrients. Our central unit is in Pratápolis, southern Minas Gerais, close to São Paulo. Our goal is to develop the production of these fertilizers in line with the technological transition agriculture is undergoing globally towards more sustainable practices and lower carbon footprint.

### Can you elaborate on Morro Verde's product offerings?

We produce a variety of products, including reactive natural phosphate and agricultural limestone (rich in magnesium). We also work on customized mixtures to meet agricultural producers' specific nutrient needs. Our products are not only commodities; they include partially acidulated products for those who prefer quicker solubility and organominerals. Additionally, we are developing a fertilizer enriched with microorganisms that enhance soil health. Our goal for 2024 is to produce 600,000 t of phosphate and limestone, with a target of reaching 1.5 million t/y within a few years. ■



**Adriano Espescht**

CEO  
**POTÁSSIO DO BRASIL**

### Can you give us an update on Potássio do Brasil since 2023?

Our implementation license at our flagship Autazes project was approved, which enables us to advance into full-scale construction. We are finalizing significant contracts for tasks such as wildlife relocation, archaeological surveys, and vegetation clearance. Our initial objective is to meet Brazil's domestic potassium demand.

The Autazes project is designed to produce 2.2 million t/y of potassium, which is equivalent to approximately 17% of Brazil's current demand. This will substantially reduce our dependency on imported potassium, which currently stands at 98%. The project involves an investment of approximately US\$2.5 billion. We anticipate a 4 to 4.5-year construction period.

### Can you discuss how Amazonas is evolving as a mining jurisdiction?

Amazonas holds significant potential for mining, particularly for minerals such as niobium, tantalite and gold. It remains largely underexplored, which presents a future opportunity for the industry. The state government has recently reestablished its mining regulatory body to support and facilitate mining activities. Infrastructure remains a challenge, primarily due to limited road networks. ■



# Transition Minerals

## Brazil positions itself to become a critical minerals provider

Brazil's mining future lies in precious critical minerals crucial for electrified supply chains. Geopolitical fissures between the West and China are creating opportunities for Brazil to provide alternative, diversified supply chains for these critical materials. In 2024, key developments in the Brazilian lithium scene included Pilbara Minerals' proposed acquisition of Latin Resources and its Salinas project for over US\$360 million, as well as Sigma Lithium receiving a R\$487 million commitment from BNDES for a 16-year loan to double production. These developments signal international and domestic appetite for Brazilian lithium.

Lithium Ionic, a TSX-V listed lithium exploration and development company, is one of Brazil's principal lithium players and is developing its flagship Bandeira project, situated between CBL and Sigma Lithium's properties. A feasibility study conducted for the Bandeira projected an NPV of US\$1.3 billion post-tax, based on a 14-year project life at an annual production of 178,000 t/y. Paulo Misk, COO of Lithium Ionic, said: "Our region boasts high-grade spodumene and minimal amounts of other lithium minerals, ensuring excellent recovery rates of 68.9%. The large crystals mean we do not need extensive grinding, allowing for a simple, low-cost process using ore sorting and Dense Media Separation (DMS)."

The solid economic fundamentals of Brazil underpin lithium projects in the country as a mining jurisdiction. Misk added: "Besides great geology, Brazil offers a low capital intensity; US\$785/t of LCE compared to global averages of over US\$1,000/t for project development."

Sigma Lithium, which operates the world's fourth-largest lithium industrial complex in Brazil's Lithium Valley, is another industry reference that has transformed the region, driving social and economic growth and development. The company became the first Brazilian exporter of 'green lithium' at the end of 2023, exporting its 'Quintuple Zero Green Lithium', which the company claims uses zero carbon, zero coal power, zero tailings dams, zero utilization of potable water and zero use of hazardous chemicals for production. Ana Cabral, co-chairperson and CEO of Sigma Lithium, said: "We established a state-of-the-art lithium industrial plant in one of Brazil's poorest regions, transforming the area's economic landscape, which now grows at a rate of 20% per year."

The success of Sigma Lithium's operations stands in contrast to the development of the lithium industry globally and the scale of the task to provide lithium supplies necessary for electrification of supply chains. Projections of future lithium demand far outstrip current and planned production figures. Cabral added: "Since 2018, despite billions of dollars having been invested in lithium globally, Sigma Lithium is the only company that has achieved commercial production at this scale and low cost, ensuring our adaptation and competitiveness amidst volatile market fluctuations."

Sigma Lithium's success and industrialization efforts have faced a common challenge: the availability of labor. Cabral explained how the company overcame this issue: "We initiated a 'homecoming program' to recruit talent from the region, including people who had emigrated, successfully employing 85% of our 1,200 employees from the local area."

Marc Fogassa is CEO and chairman of Atlas Lithium, a NASDAQ listed lithium developer, whose Minas Gerais lithium project is set to enter production in Q4 of 2024. In addition, the company is pursuing REE and graphite projects in the country. Cognizant of the difficulties facing the lithium market due to high volatility and low prices, Atlas Lithium's strategy has been to excel in cost discipline and secure off-take agreements early. Fogassa said: "Atlas Lithium has established significant partnerships with major companies. Chengxin Lithium Group, associated with BYD and Yahua Industrial Group, a Tesla supplier, invested US\$10 million in December 2023, and committed another US\$40 million upon certain customary milestones. In March 2024, Mitsui, a major Japanese conglomerate, invested US\$30 million."

For Fogassa, green lithium is what will separate Brazilian lithium producers from the pack. Fogassa commented: "The plant is designed to use minimal water, setting a new standard for water efficiency in lithium processing. We are also in the process of working with the state electric utility to obtain a dedicated power line which will transmit renewable hydroelectric power as we aim to run a carbon-neutral operation in the future."

Vinicius Alvarenga, CEO of Companhia Brasileira de Lítio (CBL), which produces nearly 45,000 t/y of spodumene concentrate and around 2,000 t/y of lithium chemicals,

discussed some of the industry's principal challenges. Low prices have impacted CBL, which is exploring the potential of expanding its operations. This year, it became the first lithium company worldwide to receive the BV 360 certification from Bureau Veritas, a comprehensive ESG award.

Alvarenga was critical of the current stance of the Brazilian government regarding EV adoption: "While commendable for its environmental benefits, Brazil's unique focus on ethanol as a sustainable fuel has inadvertently isolated the country from global shifts towards electric mobility, lacking comparable incentives or infrastructure support for EVs."

### Nickel: The green alternative

In addition to lithium and REE, Brazil's nickel scene is also growing, with Brazil's geography, geopolitics, and green energy credentials providing it the ability to carve out a niche in global nickel markets, presently dominated by Indonesian producers. Centaurus Metals, an ASX-listed Australian developer, has recently delivered a positive feasibility study for its flagship Jaguar nickel project located in Pará state. The results include an estimated mine life of 18 years at an average annual production of 18,700 t and forecasted pre-production capital expenditure of US\$371 million, and the company is actively value engineering to improve these results. Bruno Scarpelli, Centaurus Metals' country manager, said: "Brazil offers several important cost advantages as a mining jurisdiction – it has ultra-low-cost energy, a low corporate tax rate and an attractive Government royalty regime."

Indonesian and Chinese dominance of critical mineral production, including nickel, is well established, but Brazil-focused miners want to differentiate their products, stressing Brazil's green energy matrix and stringent environmental regulatory framework, in contrast to their Asian competitors. Scarpelli said: "While Indonesia's laterite nickel deposits are substantial, they are energy intensive and primarily coal-powered, resulting in high carbon footprints... Brazilian power is almost entirely generated from renewables, so in addition to

being low cost, Jaguar's power supply will also have extremely low carbon emissions."

Another prominent developer of nickel in the country is Brazilian Nickel, focused on its flagship Piauí nickel project in northeast Brazil, which is at an advanced stage. According to Mark Travers, CEO of Brazilian Nickel, the Piauí nickel project is intended to be the first to apply the heap leaching process on a commercial scale for nickel. Discussing the Piauí project's ESG credentials, Travers mentioned: "Our clean energy profile features a low CO2 intensity in our nickel production, especially in our mixed hydroxide precipitate (MHP), one of the lowest CO2-emitting products in the market."

Underlining the vital role of private equity investments in the sector and the importance that Western governments are assigning critical mineral projects, Brazilian Nickel's financiers include TechMet, a company focused on financing projects that contribute to the energy transition and the U.S. Development Finance Corporation.

Travers commented: "While traditional nickel sources have been heavily concentrated in Indonesia and China, we see an opportunity to fill that gap by providing a sustainable alternative from Brazil."

In Bahia state, a Brazilian company, Bahia Nickel, is developing its Mangueiros project, a magmatic nickel, copper and cobalt sulfide deposit, offering a uniquely boat-shaped geometry with mineralization at shallow depths. The project, which is still in the early stages of development, was acquired from the Companhia Baiana de Pesquisa Mineral (CBPM), Bahia state's own mining company. Discussing the potential timeline of the project and how global trends in the nickel market could affect it, Elton Pereira, CEO of Bahia Nickel, said: "The nickel market is challenging right now, with challenging prices due to global supply fluctuations from Indonesia, but our project's timeline to start production aligns well with predictions for market recovery, which experts suggest will happen around 2028 to 2030." ■

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“The unique geological conditions in the Jequitinhonha Valley favor spodumene crystallization, making it one of the best areas globally for lithium extraction.”

## Paulo Misk

COO  
LITHIUM IONIC

### Can you introduce us to Lithium Ionic and the company’s history in Brazil?

Lithium Ionic is listed on the TSX-V, focusing on lithium exploration and development to produce lithium concentrate in Brazil. The company started its activities in late 2021, purchasing tenements in the Vale do Jequitinhonha. Initially, we had five tenements; today, we own or have options on 14,180 hectares, a significant jump in just three years. We raised C\$7.5 million, conducted geochemical research, identified anomalies, and started drilling in April 2022. In two years, we developed more than 60 million t of resources at our flagship Bandeira project with a feasibility study. We began the environmental license process in November of last year. In my opinion, we have the best lithium project in Brazil, and we have a very competitive OPEX and a solid commitment to social and environmental responsibility.

### Can you give us an overview of the company's lithium projects in Brazil and details about your Bandeira project's recent feasibility report results?

Our 14,000 hectares are in Araçuaí, with additional tenements 100 km away in Salinas, where we are exploring. The Bandeira project is uniquely located between CBL and Sigma Lithium, two major lithium operations in Minas Gerais, Brazil's pre-eminent mining state. The area

is well-supported with clean hydro-electric power, relatively close to port facilities (350 km), and has sufficient water and road infrastructure. The recent feasibility study report, which was just concluded, has found that the project will involve underground mining to produce 1.3 million t/y of ore, with minimal surface impact and environmental considerations. We aim to produce 178,000 t/y of concentrate, with a 14-year project life, US\$266 million CapEx, and an NPV of US\$1.3 billion post-tax. Our OPEX is US\$444/t of concentrate, making it highly competitive. The Bandeira area has 41 million t of lithium resource, supporting our long-term plans with low mining risk and proven technology.

### What was the commercial strategy behind acquiring the remaining 15% of the Salinas assets?

We initially obtained 85% of the tenement and recently acquired the remaining 15% after identifying about 15 million t in the area. Salinas's potential is comparable to the Bandeira project, prompting us to secure full ownership.

### How does the Lithium Valley in Minas Gerais compare to other lithium hotspots across the Americas?

Our region boasts high-grade spodumene and minimal amounts of other lithium minerals, ensuring excellent recovery rates of 68.9%. The large crystals mean we do not need exten-

sive grinding, allowing for a simple, low-cost process using ore sorting and DMS. The unique geological conditions in the Jequitinhonha Valley favour spodumene crystallization, making it one of the best areas globally for lithium extraction.

### Why should international investors commit their capital to mining projects in Brazil?

Besides great geology, Brazil offers a low capital intensity (US\$785/t of LCE) compared to global averages of over US\$1,000 for project development. Our NPV to CapEx ratio is 4.9 times higher than the average for hard rock and brine projects elsewhere. Brazil's implementation costs are lower than those of Europe or Africa, making it an attractive destination for global investors.

### Can you discuss Brazilian lithium's role in electrifying supply chains and vehicle fleets globally?

Lithium is crucial for both mobile and stationary batteries, and its role in energy storage is unmatched. Despite past work with vanadium, lithium is the best solution for energy storage, and its demand will continue to grow beyond 2028. The future of lithium is very bright, as all forecasts point to demand outpacing supply by 2028 as electrification continues to scale, meaning that the price of lithium will continue to rise. Brazil's lithium will be vital in meeting this demand and supporting the global energy transition.

### What are Lithium Ionic’s priorities for the coming year?

Following the conclusion of the favourable feasibility study for our Bandeira project, we aim to secure the environmental license by Q3 2024. We are currently negotiating with strategic investors and fundraising for the project’s CapEx needs. We will continue exploration at Salinas and other tenements in the Jequitinhonha Valley, targeting Bandeira project production by 2026 and Salinas by 2027. Our focus is to establish Lithium Ionic as a key player in the lithium market, with a strong commitment to social and environmental responsibility. ■



“Our ability to achieve zero emissions and deliver on sustainability metrics allows us to effectively withstand market fluctuations.”

## Ana Cabral

Co-Chairperson and CEO  
SIGMA LITHIUM

### Can you give us a brief introduction to Sigma Lithium and its history?

Sigma Lithium operates the world's fourth-largest hard-rock industrial lithium mining complex in the Vale do Jequitinhonha, Minas Gerais, specializing in industrializing lithium concentrate. Currently, we are the sixth largest lithium producer globally. We established a state-of-the-art lithium industrial plant in one of Brazil's poorest regions, transforming the area's economic landscape, which now grows at a rate of 20% per year. Our production is unique; thanks to our Quintuple Zero Green Lithium, we have achieved zero emissions in five critical environmental sustainability categories—zero net-carbon, zero tailings dams, zero dirty energy, zero consumption of drinking potable water, and zero toxic chemicals. Our lithium products are technically superior and unique, high in purity, low in contaminants, and provide 20-30% cost savings for customers compared to similar products.

### Can you elaborate on Sigma Lithium's Grota de Cirilo production complex?

We operate the fourth-largest lithium mineral industrial project in the world. As we double our scale we will be positioned among the top four lithium producers globally. Since 2018, despite billions of dollars having been invested in lithium globally, Sigma Lithium is the only company that has achieved commercial production at this scale and low cost, ensuring our adaptation and competitiveness amidst volatile market fluctuations. We surpass every company in the industry in every key metric for lithium production in terms of environmental and social traceability, making us a permanent member of the global lithium production landscape.

Based on our published costs last quarter, we deliver high-purity, low-contaminant, and large-particle lithium materials at a cost of US\$389/t. This positions us as the second lowest-cost producer globally among lithium industrial producers sourcing lithium from rock. Our ability to achieve zero emissions and deliver on sustainability metrics allows us to effectively withstand market fluctuations.

### What challenges has Sigma Lithium faced ramping up operations?

When we decided to build our state-of-the-art lithium plant at the mine site, we encountered skepticism due to the Vale do Jequitinhonha's economic conditions. Our

journey has been long, but we executed our plan with discipline and conservatism. We allocated two-thirds of the proceeds from our IPO in 2018 to construct an on-site demonstration industrial plant, allowing us to send bulk samples to major global clients and establish Brazil and Sigma Lithium's credibility in the market. We showcased our capabilities, utilizing gravity-based dense media separation and dry stacking without tailings and water reuse. Since 2018, Sigma Lithium is the only company that has successfully industrialized lithium, entering the lithium market with scale, low cost and traceability, which is crucial from an ESG point of view. In the context of the global energy transition, you would need 54 times our production capacity to meet projected global demand by 2030.

Despite the relative underdevelopment of the Vale do Jequitinhonha, Minas Gerais is an industrialized state, so we have significant infrastructural advantages, including hydroelectric power, good roads and proximity to ports. From an operational point of view, human capital emerged as the most significant challenge, and we initiated a 'homecoming program' to recruit talent from the region, including people who have emigrated, successfully employing 85% of our 1,200 employees from the local area.

### How is Sigma Lithium engaging with local communities through its programs?

We established two significant social programs. First, we initiated small-scale irrigation basins to convert subsistence farmers into year-round farmers, impacting around 10,000 people. Second, our microcredit program currently assists 2,000 women, which we aim to expand to include 10,000 families. These programs do not require reskilling; they utilize existing skills in culinary arts and crafts, allowing these women to monetize their expertise. The direct impact of our initiatives can be quantified, with the local economy growing by 20%, making it the fastest-growing region in the country.

### What objectives do you have for Sigma Lithium in the next 12 to 18 months?

We are doubling our capacity by building a second green industrial plant. The infrastructure required for this expansion, including a power substation and water treatment facility, is already in place, making expansion more straightforward. We aim to achieve our target of becoming the world's fourth-largest lithium producer, growing by an additional industrial line at a time. ■





## Marc Fogassa

CEO and Chairman  
ATLAS LITHIUM

### Can you introduce our readers to Atlas Lithium and its history in Brazil?

We are an American company listed on NASDAQ and hold Brazil's most extensive portfolio of lithium exploration areas, with 539 square km of mineral rights. Our flagship hard-rock lithium project, the Neves project, is in the Vale do Jequitinhonha, a well-known lithium district in the northern part of the state of Minas Gerais. We will be open pit mining and extracting primarily spodumene, one of the most important lithium-bearing minerals.

Atlas Lithium has established significant partnerships with major companies. Chengxin Lithium Group, associated with BYD and Yahua Industrial Group, a Tesla supplier, invested US\$10 million in total in December 2023 and committed another US\$40 million in total upon certain customary milestones. In March 2024, Mitsui, a major Japanese conglomerate, invested US\$30 million, and owns approximately 12% of Atlas. These partnerships provide not only substantial funding but also enhance our market credibility and position.

### Can you elaborate on the sustainability credentials of your lithium projects?

Our processing plant will utilize Dense Media Separation (DMS) for extraction, a technology traditionally used in the preparation of spodumene concentrate, which will be our commercial product. It will take a much smaller footprint and be lighter than similar plants in Brazil, thus significantly reducing its environmental impact. Furthermore, the plant is designed to use minimal water, setting a new standard for water efficiency in lithium processing. We are also in the process of working with the state electric utility to obtain a dedicated power line which will transmit renewable hydroelectric power as we aim to run a carbon-neutral operation in the future. This will also include using EV trucks to replace conventional ones in the future.

Our plant will recycle the water used in processing, and its production rejects will be able to be sold for further mineral extraction or used for road paving. ■



## Vinicius Alvarenga

CEO  
COMPANHIA BRASILEIRA DE  
LÍTIO (CBL)

### Could you update us on the latest developments at CBL?

We produce nearly 45,000 t/y of spodumene concentrate and around 2,000 t/y of lithium chemicals, approaching total capacity. This year's significant milestone was obtaining the BV 360 ESG certificate from Bureau Veritas, which validates our comprehensive approach to ESG principles. Our safety record is free of serious incidents or fatalities throughout our operations, highlighting our commitment to safety and operational excellence. It is a core element supported by extensive training and technological investments.

### What are the main challenges faced by CBL in the current market?

Despite optimistic future demand projections, current market conditions are subdued. The concept of an incentive price, critical for investment decisions, remains uncertain. Market volatility has tempered earlier bullish projections, influencing our expansion and operational strategies.

### What role does the Brazilian government play in promoting EVs and energy storage systems?

Rather than fostering electric vehicle adoption, the government has opted to impose tariffs on imports, potentially stifling the development of an EV ecosystem. This approach contrasts sharply with other major economies that have implemented supportive policies to spur EV purchases and related industries. While commendable for its environmental benefits, Brazil's unique focus on ethanol as a sustainable fuel has inadvertently isolated the country from global shifts towards electric mobility, lacking comparable incentives or infrastructure support for electric vehicles. This disconnect between policy intentions and practical outcomes underscores the need for cohesive governmental strategies to bolster industry competitiveness and align with global energy transition goals.

### What are CBL's objectives and milestones for the upcoming year?

Looking ahead, we are conducting a feasibility study to double our mining capacity and triple our lithium chemicals production. Due to current market uncertainties, we are extending this study to make informed decisions aligned with future market conditions. ■



## Rare Earth Elements

### Not so rare in Brazil

Goiás is at the centre of Brazil's REE scene. Serra Verde is one of the few companies able to tap into an ionic-lay REE deposit. The company, whose backers Vision Blue and Energy and Minerals Group invested US\$150 million in 2022, has entered production, making it the first scale operation to produce four critical magnetic REEs outside of Asia. They are optimistic that the demand for non Asian REEs will boom, due to the prevalence of high-value heavy and light REEs, primarily neodymium, praseodymium, terbium and dysprosium, crucial for battery production and for military and aerospace applications. According to Thrás Moraitis, CEO of Serra Verde: "The transition to clean energy relies heavily on rare earths. This necessity extends beyond commercial applications to geopolitical and military uses, making rare earths critical in global energy strategies."

Moraitis was positive about Serra Verde's interactions with the authorities, acknowledging that they are aware of Brazil's opportunity to compete with Asian producers and become a partner of choice for Western, high-value manufacturers. "Europe, Canada and the US have provided substantial financial support to their critical minerals industries. Brazil should consider similar funding initiatives to help local producers compete globally," he said.

Aclara Resources, a heavy rare earth-focused developer with projects in Chile and Brazil, is developing its heavy rare earth, Carina Module project, also in Goiás. The company IPO in 2021 raised US\$100 million, which it funneled into exploration in Brazil. A recent PEA for the Carina Module conducted by GE21 Consultoria Mineral outlined a project life of 17 years, processing 150 million t/y over this period, and a net present value (NPV) of US\$1.2 billion. Francois Motte, CFO of Aclara Resources, said: "Our process is highly sustainable; unlike traditional mining, we avoid explosives, crushing, and milling, which reduces energy consumption and environmental impact. Our patented Circular Mineral Harvesting technology efficiently recovers rare earths from ionic clay with a minimal ecological footprint. The process uses ammonium sulfate, a common fertilizer, which is non-harmful when appropriately handled. We employ a water recycling system akin to desalination plants, achieving a 95% water recirculation rate. The mining operation generates no tailings and ensures the land is returned to its original state with revegetation."

In addition to its patented technology, Aclara Resources is pursuing a vertical integration strategy. Motte said: "This integration allows us to control the entire production process, from raw material extraction to final product refinement, enhancing our market position."

Brazilian Rare Earths (BRE), the ASX-listed developer of rare earths founded in 2021, recently raised US\$80 million to develop highgrade ionic deposits in the Rocha da Rocha critical minerals province in Bahia state. The company has confirmed high-grade intercepts through its drilling campaign, placing it at the forefront of global REE projects. Bernardo Da Veiga, managing director and CEO of BRE, said: "During the drilling at Monte Alto, we hit a significant intercept: 14 m at 11% in saprolite. Ionic clays typically have grades between 0.1% and 0.3%, so we realized that this mineralization could not possibly be ionic clays. It turned out to be coarse grained liberated monazite in the saprolite."

The high grades have convinced BRE that the company can commercialize its deposits with minimal impact on the region. da Veiga explained: "We only need to mine a small volume to produce the same amount of rare earths as lower-grade deposits, leading to lower environmental impact, reduced water and energy usage, and less dust and noise."

BRE's project could transform Brazil's rare earths sector, but more needs to be done from the federal level. BRE's da Veiga commented: "Brazil needs to incentivize companies to add value domestically through political, tax and other policies that support the establishment of downstream operations. Brazil already has a large industrial base and a skilled workforce. These factors position Brazil well to become a critical minerals powerhouse."

REE deposits are also attracting the attention of junior companies with interests in copper and other such commodities, including Alvo Minerals, an ASX-listed Australian junior focused on developing its Palma copper-zinc VMS project, but also venturing into REE through its Bluebush ionic clay rare earth project, adjacent to Serra Verde. Rob Smakman, CEO of Alvo Minerals, said: "Bluebush was too good to be overlooked. It is adjacent to our base in Tocantins and to Serra Verde, the only ionic clay project outside China that is in production."

Another example is Appia Rare Earths & Uranium Corp, with its history of uranium and rare earth projects in



northern Canada, that made the foray into Brazil in early 2023, entering an ionic absorption clay project near Iporá, again in Goiás. Stephen Burega, president of Appia Rare Earths & Uranium Corp, said: "Our experience in Brazil has been exceptional, showcasing supportive mechanisms and streamlined regulatory frameworks that make it a top global mining destination."

Appia Rare Earths & Uranium Corp's experience in Brazil points to an evolving regulatory approach to critical minerals exploration, with the federal government grasping the importance and potential of the country to significantly benefit from a diversification of supply chains away from Asia. According to Burega: "Brazil's rich mineral resources, including rare earths, position it to become a significant global player, provided technological advancements and local resources are effectively leveraged."

Though Goiás' REE potential is well established, in neighbouring Minas Gerais, several rare earth projects have also attracted the attention of foreign investors. In Poços de Caldas, several Australian players are developing substantial REE projects. One such company is Meteoric Resources. The ASX-listed company has an ambitious goal: to be the next major producer of rare earths globally. In the past year, it signed a US\$250 million MOU with the US Export-Import Bank, a sign of how Western institutions are taking a key interest in Brazilian critical mineral projects. Marcelo de Carvalho, Meteoric Resources' Brazil country manager, said: "We are focusing on three main areas: li-

censing, environmental studies and financing. We are investing nearly US\$2 million per month to advance these aspects simultaneously."

As part of this effort, in 2024, Meteoric Resources completed a scoping study, is working on its Caldeiras project pre-feasibility study and launched an environmental assessment, all intending to advance its Ionic Clay project. The scoping study conducted by Ausenco suggested Caldeiras will benefit from globally competitive OpEx, which Meteoric hopes will shield it from low prices. In addition, the company has already secured offtake agreements for 60% of its product. According to de Carvalho: "Additionally, we are engaged with the Brazilian government and the BNDES to attract investments into Brazil's rare earth downstream industry."

Next door and also in Poços de Caldas, Viridis Mining and Minerals, an Australian ASX-listed junior with projects across Australia, Canada and Brazil, has decided to focus its attention on Minas Gerais, where it is developing the Colossus REE project. Rafael Moreno, CEO, joined the company at the beginning of 2024 with a mandate to take Colossus from exploration to production. According to Moreno, the Brazilian government, through the National Mining Agency, has been engaging with REE players across the board, exploring downstream opportunities: "Brazil is positioning itself as a key player in the energy transition, with investments from major companies like BYD, Stellantis and BMW setting up regional manufacturing facilities." ■



The poster for Exposibram 2025 features a vibrant, colorful illustration of a historic street in Salvador, Bahia, Brazil, with buildings in various colors and a church tower. The text "EXPOSIBRAM 2025" is prominently displayed at the top, with the tagline "Mineração do Brasil | Expo & Congresso Brazilian Mining | Expo & Congress" below it. The main headline "SAVE THE DATE" is in large, bold, blue letters, followed by the dates "October, 28th to 30th, 2025" and the location "Salvador - Bahia - Brazil" in red. The IBRAM logo is in the bottom right corner.



## Thras Moraitis

CEO  
SERRA VERDE

### Can you introduce Serra Verde?

Serra Verde's mission is to accelerate the supply of critical materials needed for the clean energy transition by producing rare earth elements, crucial for permanent magnets used in EVs, wind generators and other technologies essential for clean energy.

### What makes Serra Verde a world-class resource?

It is the largest known ionic clay resource outside of Asia and can support a 25-year mine life at our Phase 1 production capacity of 5,000 t/y of rare earth oxides. There is also the potential to double mine production within the next decade. As an ionic clay deposit with a high proportion of heavy rare earths, Serra Verde offers operational advantages, including ease of mining and processing with benign reagents that mean we have lower operational risk and environmental impacts than hard rock operations. It's important to note that Serra Verde is now the only scale producer outside of Asia of the four critical rare earths used in the production of permanent magnets.

The site also benefits from excellent infrastructure, including 100% hydro-electric power, proximity to freeways for logistics to ports and a nearby town which supports the operation with skilled labor and services. As a result of these inherent qualities, we believe that we can become the most sustainable producer of rare earths in the world.

### What is your view on the current mining regulatory environment in Brazil?

The federal government clearly recognizes Brazil's potential to be a global leader in the provision of clean energy materials due to its diverse resources of critical materials and are taking the right steps to support the sector's development.

### Can you provide a perspective on Serra Verde's next 12 to 18 months?

We have ambitious plans to become the most sustainable and strategically important producer of all four magnetic rare earths in the world. Investing in building scale and developing our various growth options are our first priorities. ■



## Francois Motte

CFO  
ACLARA RESOURCES

### Can you introduce us to Aclara Resources and its activities in Brazil?

Our focus is on the future production of heavy rare earths from ionic clay deposits, growth opportunities, prompting us to diversify and explore for this type of deposits in Brazil. We identified a promising ionic clay deposit in Goiás, Brazil in late 2022. The Brazilian project, the Carina Module, was previously a tin mine with existing drill holes that facilitated our technology testing.

### Can you discuss the details of the PEA for the Carina module?

We have transitioned to reverse circulation drilling, allowing deeper penetration (up to 60 m), which led to a significant resource increase, now estimated at 298 million t—an 77% rise from the 2023 resource estimate. Our current PEA, based on 168 million t, projects a 17-year operational life, with 150 million t to be processed over that period and an NPV of US\$1.2 billion, discounted at 8%. Brazil has proven to be a very positive place to develop our project, with relatively low energy costs as Goiás relies almost entirely on renewable energy. We have found lower labor costs and the project's scale is helping us to mitigate fixed costs. We anticipate an updated PEA for the Carina Module in September 2024, and a pre-feasibility study with Hatch, including environmental baseline assessments is underway and expected to be completed by mid-2025.

### How does Aclara Resources' vertical integration strategy impact its market position?

Our vertical integration strategy is pivotal; we will produce rare earth carbonates from our ionic clay deposits and advance to separation and metal analysis processes. This integration allows us to control the entire production process, from raw material extraction to final product refinement, enhancing our market position. This approach also allows us to offer better commercial terms, which are essential for competing against established players and meeting the needs of customers who require high-quality, sustainably produced materials. ■





## Bernardo da Veiga

Managing Director and CEO  
**BRAZILIAN RARE EARTHS**

### Could you give us an introduction to Brazilian Rare Earths?

Brazilian Rare Earths was founded in early 2021, when we decided to explore critical mineral opportunities in Brazil. We initially staked about 460 square km of tenements. Our maiden JORC resource in ionic clays was 169 million t at approximately 1,500 ppm. During the drilling at Monte Alto, we hit a significant intercept: 14 m at 11% in saprolite. This led us to decide to focus on the Monte Alto area in the hope of delineating a monazite sands deposit in the area. In the process of drilling this area we discovered a number of outcrops and subcrops of exceptionally high grade, averaging around 33% TREO, over 1% niobium, over 200 ppm of scandium and over 4,000 ppm of uranium. This discovery prompted us to shift our focus to the high-grade hard rock potential at depth.

We commissioned a maiden diamond drilling campaign in late 2022, confirming significant high-grade intercepts at depth. We found astonishing grades, with some intercepts in the high thirties, averaging about 18%. These high grades were complemented by valuable co-products, including around 0.6% niobium, over 200 ppm scandium, and nearly 0.3% uranium. Monte Alto has a small footprint and is relatively easy to operate compared to other rare earth project globally. We only need to mine a small volume to produce the same amount of rare earths as lower-grade deposits, leading to lower environmental impact, reduced water and energy usage, and less dust and noise.

### What are the key milestones you expect to achieve in the coming year?

Our key objectives are to continue developing Mont Alto. We aim to publish an updated resource in the future, ensuring that we have exhaustively completed all necessary drilling before doing so. We are progressing towards a scoping study and, ultimately, a feasibility study. Our approach to moving Monte Alto into production is to do so as quickly as is sensible. ■



## Marcelo de Carvalho

Executive Director  
**METEORIC RESOURCES**

### Can you update us on Meteoric Resources' activities over the past year?

Over the last year, Meteoric Resources has been focused on advancing its Flagship Caldeira project and our primary goal is to become a low cost and environmentally sustainable producer of significance in the rare earth sector. We are focusing on three main areas: licensing, project design and metallurgical studies, and resource classification. We recently completed a scoping study and are currently working on a pre-feasibility study. We also launched our full environmental assessment and will participate in a public hearing soon. We expect to receive our preliminary license early next year if the hearing goes well. Construction is forecasted to begin late in 2025, with production targeted for late 2027. Our scoping study indicates that we have one of the lowest OpEx in the world for ionic clay deposits, making our project very competitive even with current low prices.

Offtake agreements are vital for our project's success. We signed our first offtake agreement with Neo Performance Materials six months ago for 3,000 t of TREO (Total Rare Earth Oxides). Recently, we signed a second agreement with Ucore, focusing on their new technology for rapid solvent extraction. We expect to produce around 11,000 t/y of TREO in the first five years.

### Can you discuss the Caldeira project's sustainability credentials?

Rare earths are crucial for the energy transition, and our project emphasizes sustainability. The process involves simple steps: taking clay from the surface, washing it with ammonia sulfate, drying it, and returning it to the pit. We are studying how to recycle the clay and spent ore for agriculture and other industries. Six months after mining starts, the topsoil is restored. We recirculate more than 80% of the water, reuse about 98% of the reagent, and our energy comes 100% from sustainable sources. Our initial carbon footprint calculations are promisingly low, and we aim to further reduce it to achieve a carbon-zero project. ■

# Critical Mineral Developers Speak out



### Mark Travers, CEO, **BRAZILIAN NICKEL**

"We are focused on producing nickel through our flagship Piauí nickel project. We will be the first to apply the heap leaching process on a commercial scale for nickel."



### Stephen Burega, President, **APPIA RARE EARTHS & URANIUM CORP**

"Brazil's proactive approach, especially in critical minerals (including rare earths) and the commitment being proposed for in-country beneficiation, demonstrates a strong commitment to global leadership in this sector."



### Elton Pereira, Country Manager, **BAHIA NICKEL**

"The Mangueiros nickel project is a magmatic nickel, copper and cobalt sulfide deposit associated with ultramafic rocks, not a laterite deposit. The geometry is unique; it is boat-shaped, horizontal and close to the surface."



### Bruno Scarpelli, Country Manager, **CENTAURUS METALS**

"We recently delivered a positive feasibility study for the Jaguar project development, which confirmed very promising economics and a clear pathway for the development of Jaguar as a sustainable, long-life and low-cost nickel project."



### Rafael Moreno, CEO, **VIRIDIS MINING AND MINERALS**

"Our primary focus is the Colossus REE project in Minas Gerais. Metallurgical tests have shown we can leach the material with cheap solvents, providing a low-CapEx, low-OpEx opportunity to develop a strong business model."



### Rob Smakman, CEO, **ALVO MINERALS**

"Bluebush was too good to be overlooked. It is adjacent to Serra Verde, the only ionic clay project outside China that is in production. We aim to publish a resource and continue metallurgy and planning through towards a scoping study."





# Engineering and Consulting

“

Brazil's Lithium Valley contains 85% of Brazil's lithium reserves and will be the cornerstone for the country's sustainable energy future.

”

Chryssa Tsouraki  
CEO  
**IN-VR**

GBR Series • BRAZIL MINING 2024

Image by Curioso.Photography at Adobe Stock





# Engineering and Consulting

## Environmental compliance and mining development drives demand

The past year has seen a flurry of activity in the mining sector, which, coupled with increasing enforcement and voluntary adherence to high environmental standards, is driving demand for consultants and engineers. According to figures from IBRAM, Brazil is poised to receive over US\$65 billion in inward mining investments in the coming five years. There is a resounding sense of optimism among the consulting and engineering companies that serve Brazil's mining sector. According to Benício Júnior, Brazil manager for Klohn Crippen Berger: "The Brazilian mining sector is experiencing a recovery after a difficult period from

2016 to 2021. We see opportunities primarily in copper and iron ore projects, and there is optimism that upcoming regulatory changes will facilitate project approvals and foster growth." With over 500 employees in Brazil spread across client sites and the company's headquarters, WSP Brasil is expecting 20% growth in 2024. Mining companies are approaching consultants and engineers with sustainability in mind. Lucila Telles, country manager of WSP Brasil, said: "For our Brazil operations, nearly 75% of our revenue is linked to global ESG targets."

Another aspect of WSP's growth has been the integration of services, allowing clients to engage with the company across a range of different issues. Telles commented: "Clients are looking for a onestop shop for consultations. Solutions across different disciplines must be interconnected and we provide integrated services in several areas, such as engineering services, tailing management, mine water, mine closure, risk assessment, social, environmental, permitting and remediation."

GE21 Consultoria Mineral, a Belo Horizonte-based mining consultancy, is also experiencing rapid growth, aiming for 15-20% this year, and is expanding its reach geographically and into different industries. Bernardo Viana, partner at GE21, said: "We have opened new exploration projects and are setting up a new office in southern Brazil in collaboration with several service providers."

Leveraging their experience in Brazil, GE21 Consultoria Mineral is expanding its operations across South America. Viana said: "Argentina presents a good business opportunity due to the new government's focus on mining investment. We anticipate a boom in Argentina for at least the next three years and are eager to start our business there."

Hidrogeo Engenharia e Gestão de Projetos, also based in Belo Horizonte, is working on greenfield rare earth projects and brownfield projects for phosphate and niobium. The company, which specializes in waste and effluence management and environmental impact assessments, is seeing growth in demand for its services in these areas as mining companies increasingly focus on reusing their tailings waste and disposing of waste responsibly. Flávio Vasconcelos, CEO, commented: "The most significant challenge among our clientele is managing the leaching of salts

from rare earth mining operations, which can contaminate freshwater sources. This is incredibly challenging in Brazil due to heavy seasonal rainfall, which makes it difficult to contain the water within mining sites."

Vasconcelos also commented on the regulatory component: "While the laws themselves have not changed, enforcement has increased. The government is now paying more attention to the mining sector, ensuring that environmental impact studies are thorough and compliance is strict."

SRK Brasil is also experiencing significant growth and hiring new personnel to meet this new wave of demand. Thiago Toussaint, managing director of SRK Brasil, said: "We are seeing in Brazil a strong movement towards critical minerals. Copper and gold have been solid; lithium, rare earths and nickel are also very active."

AtkinsRéalis has over 1,000 employees in Brazil, spread across offices in Belo Horizonte, Vitória, and Paraupebas. Discussing AtkinsRéalis' work with different Brazilian miners, Maria de Lourdes Bahia, VP of mining and metallurgy Latam for the company, commented: "We collaborated with Vale on the world's first briquette plant in Vitória, launched at the end of last year. We continue to support Vale in developing new briquette plants globally."

As Brazil's mining sector diversifies, AtkinsRéalis is establishing and growing its relationships with a wide range of miners, recently completing an NI 43-101 report for Lithium Ionic and working alongside Brazilian Nickel on their flagship Piauí project. Maria de Lourdes Bahia commented: "Our focus is on commodities essential to EVs and sustainable mining, including iron ore, lithium, rare earths, and copper."

Environmental Resource Management (ERM), an environmental consulting firm, entered Brazil in 1993 and has nearly 500 employees in Brazil, with offices in São Paulo, Rio, Salvador, Belo Horizonte, and Porto Alegre, and works with major clients including Anglo American and BHP. The firm conducts ESG and climate risk assessments and risk assessments for contaminated sites. Ricardo Camargo, partner at ERM, said: "Investment banks increasingly seek compliance not just with local regulations but accordance with international best practices, as for instance the IFC Standards."

One relative newcomer to the Brazilian mining scene is the DMT Group, a German multinational consulting business which entered the market through the acquisition of Saga Consultoria, a player with over 9 years of history in this market. DMT Group has a presence across mining markets globally, and according to Jens-Peter Lux, CEO of DMT Group: "We saw great potential in Latin America and chose Brazil as our strategic hub, partnering with Saga Consultoria to solidify our presence and align with the continent's growing demand for mining and energy solutions."

This year has also been busy at CLAM Meio Ambiente, the Belo Horizonte-based environmental consulting firm. The firm is active in projects across different commodities and is working with Vale on a forest regeneration project in northern Brazil. José Cláudio Nogueira Vieira, director of CLAM Meio Ambiente, discussed how the company uses

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## Lucila Telles

Country Manager  
WSP BRASIL

### Can you provide an update on WSP Brasil since 2023?

WSP Brasil has continued its growth trajectory, maintaining a sustainable double-digit annual growth over the past five years. This year, we are expecting around 20% growth. We continue to uphold technical excellence, providing multi-disciplinary and integrated solutions to our clients across various sectors, including the mining sector that represents about 50% of our revenue.

We employ over 500 employees in Brazil across three main offices, São Paulo, Belo Horizonte and Rio de Janeiro, with additional staff at various client sites throughout Brazil. WSP Brasil is becoming increasingly significant for the mining sector and we are expanding our operations here, especially in critical minerals alongside iron ore.

The synergy between the energy, mining, and industrial sectors enhances our service offerings. For us, sustainable growth means focusing on high-value services and avoiding commodity markets where local companies can be more cost-effective. For our Brazil operations, nearly 75% of our revenue is linked to global SDG targets, reflecting our long-term commitment to sustainability. We also adopt an innovative, future-ready approach, addressing long-term challenges our clients might face in the future, supporting our clients to achieve their highest ESG standards.

“WSP Brasil is becoming increasingly significant for the mining sector and we are expanding our operations here, especially in critical minerals alongside iron ore.”

### How does Brazil compare to other South American markets regarding sustainability and environmental protection?

Brazil's abundant natural resources, such as sun, wind, biodiversity and water, make it a prime area for foreign investment in sustainable projects. In Brazil, 60% of our team focuses on environmental, social, and water projects. ESG aspects are integrated into all our services, not as separate disciplines but as fundamental aspects of our business. We have a dedicated ESG group working across sectors to address client needs and promote sustainable practices.

### What areas of the mining business is WSP Brasil focusing on?

Our multidisciplinary team provides solutions to our mining clients from pit to port in all project phases, including initial assessment, feasibility studies, permitting process, conceptual design up to the mine closure, remediation and future use. Clients are looking for a one-stop shop when it comes to consultations. Solutions across different disciplines must be interconnected and we provide integrated services in several areas, such as engineering services, tailing management, mine water, mine closure, risk assessment, social, environmental, permitting and remediation.

We see increased demand for critical minerals like lithium, nickel, and copper, driven by the global energy transition trend.

Our comprehensive services and multidisciplinary team capable of providing integrated solutions, with local knowledge and global expertise help clients navigate Brazil's complex regulatory environment. Communication with our global teams is crucial. Our global mining platform includes over 6,000 WSP professionals, enhancing our interconnectedness. This connection allows us to share knowledge, ensuring that our local operations benefit from global insights and meet the requirements of our global clients.

### How is WSP Brasil addressing the talent shortage in the mining sector?

Talent scarcity is pressing amid market growth and regulatory shifts. Our global mobility initiative is pivotal, fostering local expertise through international knowledge transfer rather than displacing it. Our diversity and inclusion efforts are vital, broadening our talent pool to encompass women and diverse regional backgrounds—currently, 55% of our workforce is female, with a growing emphasis on racial diversity. Technology plays a crucial role in alleviating labor shortages. We leverage global programs to attract and retain talent, maintaining a voluntary turnover rate below 12%, unusually low in Brazil. Technology is also key to this matter. Our global innovation team and sector-specific innovation groups focus on tailoring solutions to meet sector-specific needs, particularly in mining, where technology is integral to addressing labor gaps and boosting efficiency.

### What are WSP Brasil's key goals for the coming year?

Over the next three years, our goal is to establish ourselves as the undisputed people leader, focusing on attracting, nurturing, and retaining the top talents in the industry. We aim to boost our revenue linked to SDGs and expand our multidisciplinary approach while upholding technical excellence and fostering innovation. Our plan includes scaling our local team in Brazil to 1,000 members and enhancing diversity and inclusion. Sustainable growth, technical prowess, and innovation remain pivotal to our strategy, and our multidisciplinary local and global teams are key to ensuring we deliver superior services and maintain leadership in the market. ■



## Andrew Roy

President LATAM  
WORLEY

“Major players like BHP and Rio Tinto are evaluating new assets in Brazil, particularly in base metals and lithium. We believe investments will increase over the next 12 months.”

### Can you provide us with an overview of Worley's presence in Latin America and Brazil?

We are a professional services company of energy, chemicals and resources experts helping our customers shift their operations towards a more sustainable future. We're a global team of 50,000, with over 3,500 people based in six countries in Latin America: Mexico, Colombia, Peru, Chile, Brazil, and Argentina. In Brazil, we have around 1,000 people. Our consulting group focuses on supporting customers with new challenges around decarbonization, sustainability, and net-zero targets. We also concentrate on the tail end of the asset life cycle, including mine closure and remediation. We see growth opportunities as Brazil receives more investment in non-ferrous and energy transition materials.

Worley's history in Latin America goes back to the 1960s, with significant operations in both Brazil and Chile. We acquired the engineering arm of Camargo Corrêa in Brazil in 2010, which has provided us with extensive engineering capabilities across various industries. While mining was not a strong focus initially, we have since bolstered our presence in that sector and now have offices in regions such as Belo Horizonte and Rio de Janeiro. We are also working on hydrogen projects, particularly in the Porto do Açu area, collaborating with various companies. We also engage in gas-related projects, which are seen as pathways to net-zero operation and are involved in the production of two thermal power plants.

### Can you discuss Worley's involvement in hydroelectric and tailings remediation projects?

Hydroelectric power is a significant portion of Brazil's energy supply. We do a substantial amount of hydroelectric work in Brazil. We are looking mainly at the modernization of ageing assets. Our efforts involve updating control systems and hydraulic control. We have a dedicated team working on large-scale projects like Itaipu and Belo Monte, as well as smaller projects in Mozambique and Australia.

There are several crossovers between tailings remediation and hydroelectric operations. We address issues like dam stability and maintenance while simultaneously looking at reprocessing tailings. For instance, we have worked on projects in Chile where we are examining tailings reprocessing to reduce the risks of tailings dam failures and contamination while relocating tailings to safer areas.

### What services does Worley provide for the mining industry in Brazil?

Our service portfolio for the mining industry in Brazil includes sustaining capital and regulatory compliance, particularly in the wake of the Samarco and Brumadinho disasters, focusing heavily on tailings remediation. We have done extensive consulting work with companies like Vale on tailings remediation. We are now moving toward delivering larger green-field projects that are transformative for companies like Vale, which are diversifying their portfolios. Our experience in lithium projects positions us well in this space as we look to deliver cost-effective solutions. For our digital portfolio, one of our major digital initiatives is the development of autonomous mining solutions, both above and below ground. We are working on projects focused on autonomous operations and the electrification of fleets to phase out diesel-powered vehicles.

### How does Worley address sustainability and ESG commitments?

We have made efforts to reduce our environmental footprint, such as using renewable energy sources in our offices and eliminating single-use plastics. In our projects, we focus on designing for decarbonization, and we have systems to track and demonstrate emissions savings. In Brazil, the focus areas for decarbonization are the mining fleet and leveraging renewable energy sources like solar, wind, and hydropower. We are also optimizing mine layouts to reduce reliance on trucks and enhance material handling via conveyor systems. Social considerations are critical in the country, and we have a dedicated team focused on social responsibility. We have been involved in education and training programs in the Amazon for over 20 years, collaborating with companies like Alcoa on their bauxite extraction projects.

### What are Worley's priorities for the next 12 to 18 months in Brazil?

We are optimistic about the mining sector's developments and are excited to sponsor EXPOSIBRAM. Major players like BHP and Rio Tinto are evaluating new assets in Brazil, particularly in base metals and lithium. We believe investments will increase over the next 12 months, and we are well-positioned to assist our customers in delivering projects effectively in Brazil. We aim to leverage our capabilities across different sectors to address client challenges in the mining industry. ■





Leonardo  
Pena  
VP  
AUSENCO BRASIL

**Can you update us on the recent developments from Ausenco in Brazil?**  
We are also supporting junior companies in their early stages, not just from an engineering perspective but supporting their businesses and supporting the reports necessary to secure funding to develop their projects. Engaging early with clients is one of our main strengths. We are working on feasibility studies for lithium, rare earths, cooper, gold, nickel, cobalt, titanium, graphite and iron ore projects in Brazil.

**Can you discuss some challenges faced by the sector?**  
The permitting process in Brazil is stringent and requires high environmental standards. Our rigorous approach ensures that projects meet these requirements, which is crucial for operating and constructing plants in Brazil. Despite these challenges, Brazil's permitting, and environmental standards are considered strong and supportive of sustainable mining practices.

**How have environmental and social stewardship practices evolved in Brazil's mining sector?**  
Brazil's environmental and social stewardship practices have significantly improved, with a heightened focus on sustainability, stricter legislation and higher standards for environmental practices. Mining companies are now committed to providing sustainable solutions and adhering to advanced technological and regulatory standards. This shift reflects a broader commitment to improving practices and minimizing environmental impacts.  
Brazil is well-positioned, with 77% of its energy coming from green sources, which enhances its attractiveness as a mining destination. Advanced water and energy management technologies are prominent in Brazil's mining sector. We are implementing solutions to reduce water usage and energy consumption, which are critical given Brazil's diverse geographical conditions.

**What are Ausenco's objectives for the next 12 months?**  
We are focused on growing our business while continuing to provide innovative solutions for complex projects. Our objective is to always find a better way to address our clients' needs, while delivering effective solutions and adapting to evolving market demands. ■



Maria de Lourdes  
Bahia  
VP M&M LATAM  
ATKINSRÉALIS

**Can you give us an update on the latest developments in Brazil over the past year?**  
2024 has been an excellent and busy year so far and we remain very solid and strong in the Brazilian market, where we have around 1,100 hybrid professionals. We have built a diversified client base across Brazil's key commodities, including iron ore, copper, and nickel, among others. We recently completed an NI 43-101 report for Lithium Ionic which was very well executed. Our backlog is strong, and we continue to serve our clients from project conception to commissioning.

**What are the key commodities and projects you are currently focused on?**  
We have seen substantial demand for our services from iron ore producers. Although the global nickel market is not as robust, we support our major client, Brazilian Nickel, with their plant in Piauí state. We are also engaged in copper projects and have recently completed a lithium project.

**Can you discuss your work with sustainable mining projects?**  
We emphasize sustainable projects, such as our partnership with New Wave on aluminum and nickel residue technologies. We also collaborated with Vale on the world's first briquette plant in Vitória, launched at the end of last year.

**What are AtkinsRéalis' future goals in Brazil and Latin America?**  
We aim to continue growing by maintaining strong relationships with existing clients and acquiring new ones. Our goal is to deliver high-quality technical services and be recognized as a top-tier company. We invest heavily in our professionals' training and development, offering seminars and promoting internal growth. Monthly knowledge-sharing sessions foster continuous learning within our team. Expanding our presence in Latin America, beyond Brazil and Peru, into countries like Chile, Argentina, Ecuador, and Colombia, is also a key objective for the coming years. ■



Jens-Peter Lux  
and Vassilis  
Roubos  
JPL: CEO  
VR: Head of Consulting Services  
DMT GROUP

**Can you describe DMT Group's service offerings in Brazil?**  
VR: Our services cover the entire mining value chain, starting from Greenfield exploration, where we handle drilling campaigns and geophysical investigations, moving through resource and reserve estimation, and advancing to detailed engineering for mining operations, both underground and surface. We also focus on infrastructure, processing, and mining operations advisory services. One of our most innovative contributions is in digitalization and mining transformation and optimization towards safer and sustainable mining operations.  
A key differentiator is our ESG expertise. We have developed a sustainability certification called CERA 4-in-1, which tracks raw materials' origin and environmental impact. In Brazil, we can help local companies meet rising international environmental and social governance expectations while optimizing their operations through advanced technology.

**What opportunities does Brazil present for DMT Group?**  
JPL: Brazil has the potential to become a key supplier of raw materials, particularly to Europe, which is increasingly focused on securing sustainable and reliable sources of critical minerals. By establishing a presence in Brazil, we aim to tap into this vast resource base and contribute to securing the global supply chain. This is especially important for automotive industries, which increasingly demand transparency and sustainability in their raw material sourcing.

**What are DMT's goals for the next year in Brazil?**  
VR: We plan to enhance our core business by offering additional services to our existing clients, helping them meet new challenges, especially in ESG and advanced mining technologies. Second, we will expand our client base by reaching more companies in the mining sector that can benefit from our comprehensive service offerings. We are well-positioned to expand in Latin America and Africa. By leveraging our global network and local expertise, we aim to make Brazil a central hub for our operations across these regions. ■



Claudio  
Maia  
CEO  
TRACTEBEL LATIN AMERICA

**Can you update us on Tractebel's activities in the past year?**  
Tractebel's business for the mining industry has been growing rapidly. We are an engineering and environmental consultant for the sector, and we have expanded our footprint by opening a new office in Belém. Additionally, we are helping our clients prepare for COP 30. Our focus remains on geological and geotechnical expertise, serving the mining industry and hydropower generation, which involves large geotechnical structures.

**What are the key risks and challenges facing the mining sector?**  
Mining regulations in Brazil are complex and could benefit from simplification. Discussions are underway to streamline the current three-step licensing system into a two-step process. Health and safety are important concerns when performing fieldwork for mining clients. At Tractebel, we ensure that our engineers, biologists, and geologists are fully trained and compliant so that they can return home safely each day.

**How open is Brazil's mining sector to new technologies?**  
One of the most exciting developments is the shift away from upstream tailings disposal dams to new tailings disposal technologies. These new methods often combine existing waste disposal spaces with the need to store tailings, requiring innovation from both mining companies and consultants. This hybrid or combined approach to tailings disposal seems to be a lasting change.

**Looking ahead to next year, what are Tractebel's priorities in Brazil?**  
We are focusing on expanding our presence in the mining sector, particularly in engineering and environmental services. We are ramping up our environmental team, especially in northern Brazil, as our clients prepare for COP 30. Additionally, we expect to see significant growth in Bahia, where we have mobilized commercial initiatives. Our mission is to maintain a strong drive for our mining clients in both the environmental and engineering areas. ■





Vinicius Ambrogi  
Head of Marketing  
EBP BRASIL



Leo Melo  
CEO  
ALLONDA

“Environmental requirements in Brazil are constantly increasing, and the mining sector has to keep up. These requirements have been expanding rapidly in Pará, a significant mining state.”

“The environmental sector in mining has seen a significant transformation. There is a greater understanding of ecological solutions, not just to meet Brazilian legislation but also to obtain social licenses to operate.”

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advanced technology, including drones, in this task. In addition, Vieira mentioned how CLAM Meio Ambiente is developing environmental reports with the Brazilian Stock Exchange (B3). Discussing the increase in environmental standards in the industry, Vieira said: “We are helping our clients with GRI protocols and the new TSM Protocol that the Mining Association of Canada (MAC) introduced last year with IBRAM’s support.”

The importance of meeting international standards is highest for the various junior companies pursuing projects in Brazil and battling for financing. This demand has driven much business for Ausenco. Leonardo Pena, VP of Ausenco Brasil, said: “We focus on supporting junior companies in their early stages, not just from an engineering perspective but by understanding the business and signing off on necessary reports for the TSX.”

For Allonda, an environmental engineering services and consulting company, decarbonization commitments by mining industry players are driving demand. Leo Melo, CEO of Allonda, commented: “Following disasters like Mariana and Brumadinho, mining companies now focus on minimizing operational costs, adapting to climate change, and achieving decarbonization goals driven by investor expectations.”

Ana Paula Spolidoro Queiroz, general manager of Waterloo Brasil Consultoria Ambiental, an environmental consultant, added: “After these events, environmental agencies became more vigilant and started requiring extensive safety studies for mining operations. This heightened scrutiny has resulted in significant work for environmental consultants as companies strive to comply with these new requirements.” ■



### Brazilian company, international know-how

The GE21 team can contribute to the **discovery, development** and **evaluation** of your project.

Mineral Exploration

NI 43-101, JORC S-K 1300, CBRR

Mineral Resources and Mineral Reserves Estimates

Geometallurgy and Process

+ 15 Competent Person Qualified Person

Projects developed in 19 countries

ENERGY MINERALS

GOLD AND PRECIOUS METALS

FERROUS MINERALS

PHOSPHATE

COPPER AND BASE METALS

NICKEL

REE

OTHER





## Bernardo Viana

Partner  
GE21 CONSULTORIA MINERAL

“Last year we saw significant project growth, particularly with rare earth elements.”

### Could you give us some updates and recent news from GE21 Consultoria Mineral?

Over the past year, we have been continuously growing and expanding our operations. We have opened new exploration projects and are setting up a new office in southern Brazil in collaboration with several service providers. We will begin assisting with new projects there very soon. We have been very busy identifying opportunities for expansion outside of Brazil. We have actively promoted our industry workshops to bring clients together to discuss specific issues and subjects. These events encourage networking and provide a cost-effective way to engage with multiple clients. We gather participants in Belo Horizonte to foster collaboration and exchange.

Last year, we saw significant project growth, particularly with rare earth elements. We have developed expertise in geology and mining, as well as processing. We are investing in technology and expanding our ESG services to sectors beyond mining, including government, agribusiness, logistics, and smart cities. Our ESG focus is on understanding the spatial relationships of ESG programs with communities, supply chains, and infrastructure. We analyze geospatial data using GIS technologies.

### What are the current trends in Brazil's lithium market?

The lithium market has been volatile, with companies losing about 50% of their stock value and lithium prices dropping. Despite this, major players are still investing in lithium projects in Brazil, indicating that these fluctuations might be market adjustments. In the longer term, prices will continue to rise, but the speed of the electrification transition may be overestimated. For example, Brazil can only support widespread electric car adoption by improving its electricity production and distribution.

### What are your thoughts on the global energy transition and its impact on emerging markets?

Due to infrastructure limitations, emerging markets like Brazil face significant challenges in adopting rapid energy transitions. It is crucial to recognize the different paces at which developed and developing countries can transition. Rare earths will be critical to this transition and currently, the dominance of China in the rare earth market is absolute. Establishing mining and processing facilities in countries like Brazil is a lengthy process, taking about 9-10 years, compared to China's well-established infrastructure. Brazil

has a favorable environment for rare earth projects, particularly in ionic clays. The government should support the development of the private market step-by-step. If private companies can develop projects independently, with minimal government interference, Brazil can become a significant player in the rare earth market in the next few years.

### What is GE21 Consultoria Mineral's international expansion strategy?

We are establishing a strong presence in Argentina. We also have a representative in Malaga, Spain, to leverage its ESG and GIS technology hub. Our strategy involves collaborating with local governments and agencies to attract investments and develop local systems. Argentina presents a good business opportunity due to the new government's focus on mining investment. We anticipate a boom in Argentina for at least the next three years and are eager to start our business there. We are primarily interested in copper, gold, and critical minerals like lithium. Argentina offers significant lithium pegmatites and rare earth elements, which are different from the resources we explore in Brazil. Canadian and Australian companies are increasingly investing in Argentina. They are reallocating their investments within South America, reducing investment in Brazil and Peru this year.

### Can you discuss GE21 Consultoria Mineral's approach to workforce development?

We have a low turnover, with only two geologists and engineers leaving in the last two years. Nevertheless, Brazil's labour market is tight, especially for highly qualified labour. GE21 Consultoria Mineral is a hub for skill development due to our diverse projects. With 54 projects ongoing, our team gains broad exposure. We have dedicated resources and time to fostering talent from the most junior levels of our company, including by providing part-time educational opportunities to develop our junior staff.

### What are your growth milestones for the next 12 months?

Our focus is on improving report quality, developing our young team, and hiring senior staff. We aim for 15-20% annual growth, invest in team education, and plan to have 20 staff in Argentina by year-end. Our competitive costs and cultural similarities give us an edge over competitors from the US, Australia, and Canada. ■





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Brazil's geological makeup, consisting of ancient terrains exposed to weathering over long periods, provides great potential for rare earth projects.

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## Flávio Vasconcelos

CEO  
HIDROGEO ENGENHARIA E GESTÃO DE PROJETOS

### Can you provide an update on your activities over the past year?

During the past year, HidroGeo Engenharia e Gestão de Projetos has worked extensively on rare earth element greenfield projects, and brown-field projects for phosphate and niobium. We assist mining companies in managing their waste and environmental footprints across the sector. There is a noticeable trend in mining projects that are increasingly focused on reusing their tailings waste and ensuring environmentally sound disposal methods. This is beneficial for the environment, companies, and society at large. We observe this tendency more strongly than ever. We have projects in Minas Gerais, Bahia, and Pará. Specific areas include northern Minas Gerais, central Bahia, and southern Pará near Carajás. The northeast, including Bahia, is seeing increased mining activity. Bahia has seen its mining projects increase significantly over the past 10 years. Brazil's geological makeup, consisting of ancient terrains exposed to weathering over long periods, provides great potential for rare earth projects. This long-term exposure makes Brazil's terrains particularly suitable for rare earth mining. For instance, we see numerous rare earth projects in Minas Gerais, Goiás, and Bahia. These geological conditions mean the deposits are often found in weathered soil, which is easier to mine without the need for explosives.

### What is the outlook for lithium mining in Brazil?

The demand for lithium is rapidly increasing, driven by the electrification of supply chains and vehicles. By 2028,

the demand for lithium is expected to outpace current supply, potentially leading to skyrocketing prices. Several lithium projects are emerging in Brazil, particularly in the north of Minas Gerais. An example is Sigma Lithium, which recently started operations and for whom we conducted some acid rock assessments five years ago. Lithium deposits here are found in fresh rock, requiring different mining methods compared to rare earth elements.

### What are the biggest challenges your clients face with environmental management?

The most significant challenge among our clientele is managing the leaching of salts from rare earth mining operations, which can contaminate freshwater sources. This is incredibly challenging in Brazil due to heavy seasonal rainfall, which makes it difficult to contain the water within mining sites. Desalinization is expensive, and we must use chemical characterization and treatments to make the materials inert and prevent salt leaching. There is no one-size-fits-all solution and it requires significant investment in studies and technology.

### What is the current government's approach to environmental regulation and enforcement?

While the laws themselves have not changed, enforcement has increased. The government is now paying more attention to the mining sector, ensuring that environmental impact studies are thorough, and compliance is strict. Additionally, the norm for waste classification is changing. Previously, waste was classified as hazardous, non-hazardous, or inert. The new regulation

simplifies this to hazardous or non-hazardous based on chemical concentration. This change in classifications could lead to more mining waste being classified as hazardous, posing new challenges for the industry.

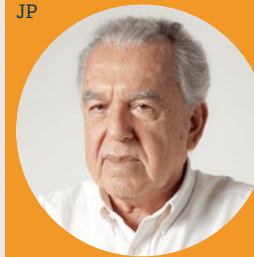
### How are companies in Brazil managing and reusing their waste?

Due to the difficulty in obtaining licenses for tailings dams after incidents like those at Brumadinho and Mariana, companies are exploring alternative methods. These include drying tailings, reusing them, or returning soil to open pits. This trend towards minimizing environmental impact is positive but challenging, requiring new technologies and economic considerations. Brazilian mining companies often look to Australia and Canada for examples. These countries are ahead in designing for minimal impact and planning for mine closure. They have government-supported research and hold regular workshops and conferences, such as those in Vancouver, from which Brazilian companies can learn.

### What are your plans and priorities for the next year?

We are focused on expansion, particularly in water and effluent management. Our Aquatec platform, which helps manage environmental data, is a crucial growth area. We aim to enhance this platform and provide more consulting services based on the data it generates. We also see the reuse of tailings as a growing field, requiring investment in mineral technology to assess potential uses and economic viability based on the region's characteristics. ■

JP



JV



## Joaquim Pimenta de Ávila and João Paulo Vieira de Ávila

JP: Founder and Chairman  
JV: CEO  
PIMENTA DE ÁVILA

### Can you update us on the company's activities?

JP: Most notable has been the rapid acceptance of our digital monitoring system for dam safety, SYSDAM, which monitors and analyzes dam safety data. Additionally, we see a heightened focus on dam decommissioning due to new regulations.

We offer engineering services, including designing and managing waste disposal systems, decommissioning and recovering structures, and developing emergency action plans for geotechnical structures. We also provide continuous monitoring through engineering records, allowing for ongoing structure safety and periodic safety audits. Additionally, we design conceptual tailings dewatering systems with methods of filtering the tailings and disposal with compaction of the filtered tailings.

### How is the sector adapting to the growing demand for digital platforms in dam safety?

JV: As information becomes more abundant, utilizing digital platforms to manage and interpret this data is crucial. These platforms help organize, analyze, and generate alerts, aiding engineers in making informed decisions and implementing risk mitigation measures.

These platforms help organize, analyze, and generate alerts, aiding engineers in making informed decisions and implementing risk mitigation measures. They complement the work of engineers by handling vast amounts of data and allowing professionals to focus on critical analysis and decision-making rather than data management. This trend is evident across various sectors, including mining and energy, where there is a significant need for effective data management solutions.

Our platform supports over 800 active users who engage with the system daily. The platform's extensive use by hundreds of professionals, both day and night, underscores its importance and effectiveness. The ability to provide valuable computational resources and real-time data to these users demonstrates the platform's critical role in their daily operations and its efficacy in addressing their needs. ■

### Can you discuss Klohn Crippen Berger's service portfolio for the Brazilian mining market?

Our geographic reach extends throughout Brazil, and we serve various sectors, particularly mining, which is a significant focus for us. We offer a comprehensive portfolio, including project management, design services, and technical support. Our key services cover process design, feasibility studies, and risk assessments, particularly for tailings dam management and decommissioning. We work with major mining clients like Vale, Vale Base Metals, Nexa, Lundin Mining, and Mosaic, providing specialized technical expertise to ensure their projects' success. There is significant demand for our services, especially from junior mining companies exploring gold, copper, and iron projects.

### What are the greatest risks and obstacles to the mining sector's growth in Brazil?

The main risks are related to regulatory changes, particularly around environmental laws and dam safety. Licensing requirements can sometimes be slow and burdensome, hampering the development of new projects. Brazil's regulations are constantly evolving, which can complicate the approval process for mining projects, especially for junior companies that may need more preparation to meet these stringent requirements. Land management issues, tax policies, and uncertainty in governance also pose challenges. These factors can impact both Greenfield and Brownfield projects, especially during the feasibility stage. ■



## Benício Júnior

Brazil Manager  
KLOHN CRIPPEN BERGER





Afonso Sartorio

Mining & Metals  
Latam Sector Lead  
EY

**Can you introduce us to EY in Brazil?**  
EY Brasil reported gross revenue of R\$ 2.9 billion for the fiscal year 2023, a 16.7% increase from the previous year, with consulting services growing by 35.1%. In July 2023, EY integrated operations from 11 Latin American countries into a single region. Mining and Metals is one of the key sectors EY is prioritizing in Brazil through our Center of Excellence for Mining and Metals, which is developing knowledge and solutions for our segment clients, particularly in Digital Operations, Technical Services, Digital Engineering, Technology Consulting, Sustainability applied to the sector, among others.

**What are the key sources for growth in Brazil's mining scene?**  
Brazil is in an advantageous position to meet the increasing demand for minerals necessary for clean technologies and sustainable infrastructures. Brazil's geological mapping currently covers only 27% of the territory suitable for investment decisions in mineral prospecting, indicating significant potential.

**What are the major challenges faced by Brazilian mining sector clients?**  
Challenges that must be addressed to ensure sustainable growth include limited geological mapping, the need to improve research centres dedicated to mineral research, capital attraction, complex regulatory issues, and lengthy environmental licensing processes. Currently, only four mining companies are listed on the Brazilian Stock Exchange (B3), and most of the capital raising from junior companies is done in countries with a financing system focused on the mining companies' needs.

**What are EY's strategic priorities for the coming year?**  
We're focused on expanding our digital operations and capital projects practice across our priority clients in Brazil, as well as our clients in Latam countries. We want to improve the breadth of our sustainability practice by closely collaborating with our Australian and Canadian practices. EY will also launch new work streams, such as Mine Closure and Capital Raising, and build a strong technology consulting and SAP S/4 practice. ■



Thiago Toussaint

Managing Director  
SRK BRASIL

**Could you update us on SRK Brasil's progress since 2023?**  
Since January, we have seen a marked increase in requests. Last year, SRK Brasil supported a major mining company in Brazil with their due diligence process. Since then, quite a few due diligences requests came in from various mining companies and group of investors. We are seeing in Brazil a strong movement towards critical minerals. Copper and gold have been solid; lithium, rare earths and nickel are also very active.

**What do you think is driving the surge in due diligence requests in 2024?**  
The high demand for critical minerals globally is a significant factor. Brazil has a significant potential for critical minerals. Significant reforms and regulatory improvements have enhanced the business environment, reducing bureaucratic hurdles and attracting more foreign capital.  
The increase of investments in the mining sector can also be related to infrastructure developments, such as improved logistics and transportation networks that can potentially lower operational costs and social and economic commitments. The National Mining Agency recently updated legal requirements for mine closure, which is also pushing mining companies towards a more sustainable scenario. While this alone does not justify increased interest in Brazilian mining, supportive government policies and initiatives have instilled confidence among investors fostering a positive climate for the mining sector.

**Can you give us your perspective on the regions in Brazil with the most significant potential for future growth?**  
There is significant potential for critical minerals in the northeast and southeast of Brazil. Investors are increasingly interested in these areas, seeking support to validate geological data and make informed investment decisions.

**What are SRK Brasil's plans for the next year?**  
We do not envisage expanding our business units shortly but invest more in critical disciplines like hydrology, rock mechanics, water management, and mine closure. ■



High Tech Ensures High Environmental Standards



**Maria Lins Albuquerque, CEO, SYNERGIA CONSULTORIA SOCIOAMBIENTAL**  
“AI can revolutionize how we handle socio-environmental data, providing more accurate and timely insights. However, it is crucial to approach AI as an evolution, not a panacea, understanding its potential and limitations.”



**Cristina Margoto, Director, HERKENHOFF & PRATES**  
“Our priority is to become increasingly data-driven, which has led us to develop our own system focused on integrating and managing socio-environmental data. This software aims to enable our clients to employ socio-environmental data strategically.”



**Daniel Bertachini, Executive Director, MDGEO**  
“During a recent project in northern Brazil focused on managing rainfall runoff into caverns, we utilized electronic devices to automate the measurement of water flow, a crucial task due to the inaccessibility of these sites.”



**Marcus Cassini, CEO, RETA ENGENHARIA**  
“Reta Engenharia uses BIM (Building Information Modeling) to estimate and quantify carbon emissions during the project implementation phase. Our key goal is to introduce innovations that positively impact the environment during project implementation.”





# Equipment and Technology

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We are observing increased demand for equipment automation, including retrofitting older machines.

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Tiago Carvalho  
Managing Director  
**TAKRAF DO BRASIL**

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Image courtesy of Vale



# Equipment

## Taking advantage of mining diversification

As mining investments have entered Brazil and new operations advance, demand for equipment is growing. The growth of activity in northern Brazil in particular presents a boon for equipment providers, who are allocating resources to establish bases in Pará state to be closer to customers. Komatsu has been at the forefront of this growth. Ricardo Alexandre Santos, vice president of the mining equipment division at Komatsu, explained: "The mining business at Komatsu has grown significantly. In 2017, we had about 400 employees; by 2024, that number has increased to over 1,500."

Komatsu decided not to sell equipment through a third-party vendor, a standard model in many mining markets, prioritizing proximity to their customer base, highlighting the importance of the Brazilian mining market. A vital part of this growth has also been increased demand for sustainable solutions from customers. Ricardo said: "We are working on projects to create hybrid trucks utilizing multiple energy sources, including ethanol, which can significantly cut CO2 emissions."

In the small and medium sized equipment space, JCB do Brasil's backhoe loader, telescopic handler, and excavator business is seeing significant demand, prompting the company to ramp up its capital investments. As Adriano Merigli, president and managing director Latin America at JCB do Brasil said: "We recently completed a cycle with investments of R\$120 million in 2020 and announced a new cycle of R\$500 million for the next five years. This will fund the expansion of our factory and dealer network and initiate the production of new products in Sorocaba."

Minax, a Minas Gerais-based equipment, personnel and service provider, has 40 years of history providing drilling, excavation, transportation, and earthmoving and rental equipment, and is well adapted to meet the surge in demand for its services. Victor Hugo, director of Minax, said companies increasingly opt to rent equipment: "This trend is especially strong in Brazil's northeast and north regions, where many companies opt to rent equipment rather than purchase it outright. This shift is driven by cost considerations and the need for flexibility."

U&M Mineração, a leading contractor in Brazil, reported managing over 300 million t of material in 2023, employing

over 3,000 people across the major mining states in the country. Once a leader in the heavy construction segment, the company has shifted its focus entirely onto mining. As it approaches its 50th anniversary, Sergio Machado, CEO and Mauricio Casara, commercial director of U&M Mineração, spoke about the importance of safety and environmental standards. Recognizing the backlog of existing and new truck fleets that lack advanced management software, or operate on alternative fuels, Casara said: "We have two major innovation projects: retrofitting existing equipment with autonomous technology by adding sensors and computers, and developing a hybrid truck project that captures and stores energy from braking."

Another primary equipment provider strategically investing in northern Brazil is Correias Mercúrio, a Brazilian manufacturer providing conveyor belts for mining and other industries. Leonardo Sales, CEO of Correias Merúrio, discussed the company's manufacturing base in the north: "The Marabá factory, completed in 2016, recently expanded its capacity by 50%. This factory focuses on heavy-duty belts for mining, but we also produce lighter belts for agribusiness. Being close to our clients is crucial. For example, delivering a belt to clients from São Paulo to Pará takes about 12 days by road, while from Marabá, it takes only 24 hours."

In the material handling space, the Beumer Group, which is represented by FAM in Brazil, opened an office in Brazil in 2020. The company has been engaged on numerous brownfield projects, guiding systems to become more sustainable in line with industry expectations. Discussing the evolving nature of the Brazilian market, and how it was impacting its business, Paulo Costa, CEO of BEUMER South America, said: "The mining sector in Brazil has traditionally focused on commodities like copper, coal, gold, and phosphate. However, there is now a significant shift towards rare earth elements and lithium, driven by the rise of electrification and new technologies... This evolving market is prompting us to adjust our processes and technology to better address these emerging needs."

TAKRAF do Brasil, a prominent German equipment provider of crushing, processing and transportation solutions to mining clients, entered the Brazilian market in 2000 through a contract with Vale. The company benefits from

Brazil's industrial base, utilizing local partners as it does not have its own fabrication base in-country. TAKRAF has been delivering projects incorporating sustainability principles on a recent contract with the Port of Iplam, Brazil's largest by capacity, as Tiago Carvalho, managing director of TAKRAF do Brasil, discussed: "We provided a solution incorporating a tube conveyor. Unlike traditional conveyors, which are open-belt designs, the tube conveyor is fully enclosed. This design mitigates environmental impact by preventing wind from spreading materials in sensitive areas."

The company is also leading the way in dry stack tailings management solutions, which are crucial for an industry that has undergone enormous change under regulatory pressure following the disasters at Mariana and Brumadinho. Carvalho continued: "We supplied Usiminas with a complete tailings processing plant. This project was the first DST solution implemented in Brazil, and it is now considered a benchmark for the industry."

Another company contributing to the industry's management and elimination of tailings dams is Huesker South America. The company makes products for soil reinforcement, drainage solutions, and overall improvement solutions, identifying a niche in the mining sector for their 'SoilTan' geosynthetic bags. André Estêvão Silva, managing director of Huesker South America, said: "One specific solution we offer is synthetic bags and textile containers for tailings storage, which are becoming increasingly in demand due to regulatory and environmental concerns."

Core Case is a relative industry newcomer and a recent success story among Brazilian equipment providers. The company, founded in 2010, produces specialized storage equipment for drill core samples. Over the past year, Core Case has focused on integrating more technology into its products, including enhanced tracking technology and RFID and QR code tags to monitor cases from site to warehouse. Daniel Bortowski, director of Core Case, said: "We want to replicate our success in Brazil in markets like Canada, leveraging our successful products and new technology-driven products like the Smart Case to achieve this."

Ambflex is a homegrown Brazilian company manufacturing products for environmental protection to prevent contamination from chemical and hazardous material spills. Nelson Pickler, Ambflex's CEO, discussed how the company is taking advantage of the ESG wave dominating the industry: "After the recent environmental disasters in Brazil, mining companies have been scrutinized. They are now adopting more sustainable practices and aligning with ESG standards. Ambflex helps mining companies meet these challenges by providing containment systems that prevent environmental accidents and mitigate risks."

Metso has been in the country for over 100 years and has more than 2,000 employees. Its physical footprint includes a castings foundry, crusher and screen factories at Sorocaba, which serve as production hubs for other regional markets. Metso is strengthening its capabilities in flotation and filtration solutions, which are vital for the Brazilian market. Marcelo Motti, VP for Metso Brasil, discussed how the mining sector's growth in the past year can be difficult to manage: "One of the primary challenges is finding competent professionals. Attracting skilled en-

gineers and professionals remains difficult. Additionally, Brazil's high cost of capital, driven by high interest rates, poses a significant hurdle."

Valmet, the Finnish provider of flow control solutions, valves and pumps, also has a production unit in Sorocaba to assemble and test valves, as well as a strategic supply centre with products and components. Valmet's mining business is growing, and the company is prioritizing sustainability and digitization to cement its market position. Fabio Maia, vice-president of the flow control business line at Valmet South and Central America, said: "We develop products designed to prevent gas leaks and reduce energy consumption. For instance, our valves are engineered to minimize CO2 emissions, and our supply chain partners must adhere to stringent ESG policies."

Similarly, for Neuman & Esser, which provides compressors, process solutions and hydrogen generators for various industries, including mining, Brazil acts as a regional hub from which it can serve the Latin American market. The German company is expanding in Chile and recently announced investments as it expands its green hydrogen generation business across South America. Rafael Serpa, sales and application manager from Neuman & Esser, commented: "We are expanding our facilities in Belo Horizonte, quadrupling our assembly area, and in São Paulo, our R&D hub, to support decarbonization initiatives, collaborating closely with local industries to promote sustainable practices." ■



### Our minds help your minds achieve smarter mines

Hexagon is the global leader in digital reality and autonomous solutions, connecting sensor, software and autonomous technologies in ONE powerful platform. We partner with customers for transformative improvements across the workflows that define a mine's safety, value, reputation, and life expectancy. Designed by mining professionals for mining professionals, our solutions are backed by meaningful support and deliver insights to help mines achieve operational excellence.

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## Ricardo Alexandre Santos

VP Mining Equipment Division  
**KOMATSU**

### Can you introduce the presence of Komatsu in Brazil?

Komatsu has various business units in Brazil. Besides mining, we have a construction unit, a factory located in Suzano, a forestry unit, a bank and Modular Mining Systems. The first factory outside Japan was established in Brazil in 1975. Until 2013, we had a distributor for our mining products, but since then, Komatsu has taken over direct distribution in Brazil, allowing us to maintain a close relationship with our clients. We cover the entire process in surface mining, from drilling equipment to hydraulic excavators and trucks. Our underground portfolio includes low-profile loaders, trucks, and roof support systems, and we are also developing transport systems for both mining segments.

### How is the distribution of operations managed within Brazil?

The mining division has 1,500 employees, and over 700 are directly in the field, working with clients' equipment. We also have a dedicated engineering team focused on the application and specification of equipment, ensuring we provide the right equipment for the right mine. Given the size of Brazil, it is critical to have our distribution close to our clients for agile service. ■



## Alcides Cavalcanti

Trucks Managing Director  
**VOLVO BRASIL**

### Could you introduce us to Volvo Brasil?

In Brazil, we have a manufacturing plant dedicated to Volvo trucks and buses that have been operating for 45 years. Additionally, we have a separate plant for Volvo Construction Equipment in São Paulo, located in the municipality of Pederneiras. Our dealer network in Brazil is extensive, comprising 13 nationwide dealer groups with 107 branches.

### Can you describe Volvo Brasil's footprint in the Brazilian mining sector?

We are market leaders in mining, boasting a market share of nearly 45% this year. Our lineup for the mining sector is robust and includes the VMX and FMX series, each designed to meet the rigorous demands of this industry.

### Can you discuss the future of vehicle electrification in Brazil?

Introducing electric trucks in Brazil marks an exciting development, though widespread adoption will take time due to regulatory and infrastructure challenges. Brazil imposes a 35% import duty on outside products, which, combined with high local taxes, impacts the viability of electric trucks. Also, infrastructure for electric vehicles is underdeveloped. ■



## Adriano Merigli

President and Managing Director  
**JCB LATIN AMERICA**

### Can you introduce us to JCB and its history Brazil?

We have been present in Brazil since 2001 and our factory in Sorocaba/SP – that also houses our Latin American headquarters – has been operational since 2012, where we produce about 5,000 machines per year. Our main products include backhoe loaders, telescopic handlers, wheel loaders and excavators, which we export throughout Latin America.

### Can you discuss the demand for JCB products and challenges in the market?

The total market in Brazil is around 30,000 machines per year. This shows the opportunity we have here. The biggest challenge is high interest rates and, more importantly, credit availability.

### How does JCB integrate sustainability into its operations?

In terms of decarbonization, the company bets on electrification for small equipment. For heavy machines, JCB has chosen to focus its development on hydrogen powertrain. The main challenge is how hydrogen will be distributed and delivered to the machines. We are in discussions with various initiatives in Brazil to explore reforming hydrogen from ethanol. ■



## Victor Hugo

Director  
**MINAX**

### Can you provide a brief history of Minax in Brazil?

We are a service provider, offering equipment and personnel for various mining activities. Our services include drilling, excavation, transportation, and earthmoving. Additionally, we provide rental services for equipment. We also handle the construction of dams and other earthmoving projects. In total, we have a fleet that includes trucks, articulated trucks such as the Volvo A30, bulldozers, excavators, drillers and motor graders, which enable us to meet the diverse needs of the mining sector. Our headquarters are in Minas Gerais, but our operations extend across Brazil.

### Can you discuss some of the major challenges facing the mining sector?

Brazil's infrastructure poses significant challenges for mining operations. Many regions lack the necessary roads and logistics to support mining activities effectively. Technological advancements and the high costs associated with machinery and equipment compound these challenges. Another significant issue is the importation of machinery, particularly larger equipment such as drills, which can lead to delays in projects. Securing skilled labor can be difficult when dealing with remote sites. ■



## Humberto Peixoto

Technical Director  
**TRIMAK ENGENHARIA E COMÉRCIO**

### Can you discuss Trimak Engenharia e Comércio's fleet offering?

Trimak Engenharia e Comércio's fleet includes over 2,000 pieces of aerial platforms, a segment we pioneered in Brazil in 1996. We also have a strong presence in material handling, with forklifts and telescopic handlers. Specifically, for mining, we have over 60 sets of mobile track crushers and screeners, predominantly diesel-powered, with some units capable of being powered by external electricity. Our inventory includes jaw crushers, impact crushers, cone crushers, and various screening equipment.

### What is the role of technology and sustainability in your operations?

We prioritize sustainability and technological advancements. All our branches use rainwater for cleaning equipment and participate in the free energy market. On-site, we use solar-powered lighting towers and aim to make our field operations fully sustainable with photovoltaic systems. In terms of equipment, we are developing electric-powered alternatives to reduce our diesel dependency. This involves retrofitting our existing mobile crushers with electric motors. We expect to have them operational by the end of the year. ■



## Sérgio Machado

CEO  
**U&M MINERAÇÃO**

### Can you discuss U&M Mineração's focus on the mining industry?

We operate in major mining states in Brazil, such as Bahia, Pará, Minas Gerais, Goiás, and Maranhão, and employs approximately 3,000 people, a number that changes with new projects.

Our current fleet includes about 250 off-road trucks ranging from 100 to 300 tons and roughly 70 excavators with capacities from 120 to 550 tons. We have shifted focus entirely to mining due to a slowdown in the construction sector.

### What are the current challenges in the mining sector?

Key challenges include adapting to new environmental demands and investing in more economical, autonomous, and electric equipment. Training and retaining skilled personnel is also a challenge.

### How is U&M Mineração addressing technological and equipment challenges?

We are tackling challenges by focusing on more economical and autonomous equipment. We are working on two main projects: retrofitting existing equipment to add autonomous technology and converting older trucks into hybrid models that capture and store braking energy. ■





Marcelo Motti  
VP  
METSO

**Can you elaborate on Metso's offerings for the Brazilian mining market?**  
In the Brazilian market, about 60% of our business comes from services. Given our century-long presence in Brazil, we have a substantial installed base that requires continuous support in parts and services. Our broad portfolio covers the entire mining process, from raw ore extraction to port delivery. After our merger with Outotec in 2020, now rebranded as Metso, we have combined strengths in dry and wet processing areas, enhancing our capabilities in flotation and filtration. This synergy has positioned us firmly in the market.

**What have been the main drivers of demand for Metso's services and products in Brazil?**  
The commodity prices for copper, iron ore, and gold are encouraging companies to expand their production and upgrade equipment. This has resulted in significant growth for us, as evidenced by our recent performance. Additionally, lithium has emerged as a new and promising sector in Brazil, with regions like Minas Gerais prominence. The speed at which these areas are obtaining exploration licenses is remarkable.

**What are the challenges and obstacles to growth in the Brazilian mining industry?**  
One of the primary challenges is finding competent professionals. Additionally, Brazil's high cost of capital, driven by high interest rates, poses a significant hurdle. This, combined with issues related to taxation and licensing, complicates project initiation and expansion.

**How does Metso incorporate ESG principles and commitments into services and products?**  
Our portfolio includes 'Planet Positive' products designed to use less energy and water, making them more efficient and sustainable. ■



Fabio Maia  
VP Flow Control Business Line  
VALMET SOUTH AND  
CENTRAL AMERICA

**Can you introduce us to Valmet in South America and discuss its commercial footprint?**  
Valmet has a global customer base across various process industries. In the mining market we offer automation and flow control solutions to move our customers' performance forward. Specifically, in Flow Control, our offering is highly specialized for valves, pumps, and controllers of the renowned Neles™, Neles Easyflow™, Jamesbury™, Stonel™, Valvcon™ and Flowrox™ brands.  
In Brazil, we have a production unit in Sorocaba, about 100 km from São Paulo, where we assemble and test valves and a strategic supply center with products and components. This unit ensures product availability and fast support for our mining clients.

**What are the main challenges clients face in the Brazilian mining sector?**  
Brazil's vast size and varying infrastructure levels present challenges. We are expanding our capabilities to support all environments, increasing our direct sales and distributor network to reach remote areas. Equipment efficiency and reliability are critical, as is sustainability, especially considering past environmental incidents. We are committed to minimizing water waste and improving energy efficiency. Our focus on sustainability, digitalization, and close client relationships helps us address these challenges effectively.

**Can you elaborate on the Flow Control Business Line's sustainability efforts?**  
We develop products designed to prevent gas leaks and reduce energy consumption. For instance, our valves are engineered to minimize CO2 emissions, and our supply chain partners must adhere to stringent ESG policies.

**What are Valmet's future plans in Brazil and Latin America?**  
We have plans to expand our structure in Sorocaba to accommodate local mining product production. This investment underscores Brazil's importance in our global strategy, making it a hub for mining solutions across Latin America. We will integrate three business lines into a single facility, enhancing synergy and service capabilities. ■



Equipment Providers on  
Operating Challenges in Brazil



**Guilherme Marocchio**, Sales and Applications Manager – Hayward Gordon Division, **EBARA GROUP**  
“We face several challenges related to regulatory compliance and manufacturing. We must ensure that the equipment meets all local regulations before it is supplied, particularly for mining operations that require specific regulatory approvals.”



**Osvaldo Lameiro Ferreira Junior**, General Manager, **NETZSCH DO BRASIL**  
“One of the primary challenges in Brazil's mining and energy sectors is navigating the complex regulatory environment, which can delay projects and add operational complexity.”



**Wagner Benson**, Managing Director, **TIMKEN DO BRASIL**  
“One of the most significant challenges we encounter is the prevalence of counterfeit bearings in the market. We invest in training to help customers recognize these fake products, which can lead to catastrophic failures if used in equipment.”



**Bruno Paiva**, Process Technology Consultant – Latam, **MOLYCOP**  
“Clients often point to the exchange rate and how it affects costs. Even though many of them work with US dollars, local taxes and import costs still drive up prices, which can be a challenge for us.”



# Growth Insights from Industry Suppliers



Paulo Da Pieve, Managing Director, **HAZEMAG DO BRASIL**

"We face several challenges related to regulatory compliance and manufacturing. We must ensure that the equipment meets all local regulations before it is supplied, particularly for mining operations that require specific regulatory approvals."



André Estêvão Silva, Managing Director, **HUESKER SOUTH AMERICA**

"One specific solution we offer is synthetic bags and textile containers for tailings storage, which are becoming increasingly in demand due to regulatory and environmental concerns."



Emmanuel Seba, CEO, **RJMG ÓLEO QUÍMICA**

"Our company was founded to cater to the demands of miners working in phosphorus and lithium, but over time, we have expanded our portfolio to encompass a broader range of reagents essential for various mineral extraction processes."



Rafael Serpa, Sales and Applications General Manager, **NEUMAN & ESSER**

"We have expanded our presence by increasing 300% our production capacities in Brazil and establishing a subsidiary in Chile, strategically focusing on decarbonization solutions."



Nilson Pickler, CEO, **AMBFLEX SISTEMAS DE CONTENÇÃO AMBIENTAL**

"We are attending events like Exposibram to expand our presence in mining. Products like containment dikes for trucks and trailers, smaller containment solutions for tanks like IBCs and drums, and chemical storage areas are particularly relevant for mining clients."



**Tiago Carvalho**

Managing Director  
**TAKRAF DO BRASIL**

## What is TAKRAF do Brasil's product portfolio for the Brazilian market?

Our focus is on mining. Our services begin post-blasting with solutions for crushing activities and extend through the entire transportation and processing process to loading onto trains or ships. We also provide conveying solutions for crushed material and have beneficiation equipment. After ore is processed, we have capabilities for storing and reclaiming materials. Our main products for the market include crushers, apron feeders, belt conveyors, stackers, reclaimers, ship loaders and unloaders, thickeners, flotation cells, filter presses, horizontal filters and screens.

## Can you tell us about your recent Dry Stack Tailings (DST) solution project?

We supplied Usiminas with a complete tailings processing plant. This included a filter press, conveyors to receive the discharge, and a thickener for processing. This project was the first DST solution implemented in Brazil, and it is now considered a benchmark for the industry. Since the legislative changed following the disasters at Mariana and Brumadinho, all mines are required to move to dry stack solutions, which has increased interest in our offering. ■



**Leonardo Sales**

CEO  
**CORREIAS MERCÚRIO**

## What is the company's manufacturing footprint in the country?

We have two factories in Brazil: one in Jundiaí, São Paulo, and another in Marabá, Pará. The Marabá factory, completed in 2016, recently expanded its capacity by 50%. This factory focuses on heavy-duty belts for mining, but we also produce lighter belts for agribusiness.

## Can you discuss Correias Mercúrio's key competitive advantages?

Conveyor belts are essential for the mining industry, especially for transporting large volumes of minerals like iron ore, copper and coal. As the demand for these minerals has grown, so has the need for efficient transportation solutions. Our products focus on reducing emissions and increasing efficiency. The extensive use of conveyor belts in Brazil minimizes the need for off-road trucks in remote mining operations. We manufacture three types of carcasses: steel cord, fabric and aramid. Our development efforts include high-tension belts for critical applications in Chile, Peru, and Brazil. Our goal is to provide solutions that increase the lifespan and performance of conveyor belts, ultimately lowering the cost per ton transported. ■



**Paulo Costa**

CEO  
**BEUMER SOUTH AMERICA**

## Can you introduce us to BEUMER South America?

FAM, which since 2022 is part of the BEUMER Group, opened an office in Brazil in 2020 to leverage Brazil's significance in global commodities. The hub primarily involves establishing an office without a manufacturing facility. The focus is on the availability of skilled and experienced people in the market.

## Can you discuss the trends and demand for BEUMER Group's products and services in Brazil?

We are mainly focusing on materials handling. Most of our current projects are aimed at sustaining existing operations rather than investing in new mines. We are seeing a trend in which internal processing systems are converted into more sustainable alternatives.

## What are your priorities for BEUMER South America over the coming years?

We are keen to observe how the market stabilizes and adapts accordingly. Additionally, we are closely watching how the new management at Vale will influence the sector. As a prominent mining company, Vale will impact the market with its new strategies and priorities. ■



# Technology

## Interoperability is the new norm

Equipment, service and technology providers benefit from Brazil's broad industrial base, which sets it apart from the other major Latin American mining markets. This industrial history and skilled workforce are crucial, enabling the application of technology developed in other sectors, which, in turn, benefits from the existence of technology clusters in the country. Guillaume Barrault, CEO of Dynamox, a market leader in wireless condition monitoring solutions in Latin America, said: "Building a company in Brazil presents unique challenges due to the demanding business environment. However, we benefit from access to highly skilled engineers and a rich talent pool."

The mining industry is trending towards increasingly automated and remote-controlled operations. In a country like Brazil, where mining operations can be found in remote and hard to reach locations, the introduction of automated tools is very significant. The sector, which is also experiencing a labor shortage, will be able to attract a newer generation of workers into the industry. A number of multinational and homegrown Brazilian companies are spearheading this effort, which includes innovative digital management systems for mining operations, to reduce down-time, increase efficiency, and deliver on ESG targets. Reducing human exposure in mines will also deliver safety benefits.

Hexagon, which offers integrated technological solutions to the mining industry, is at the forefront of companies introducing digital autonomous technologies for the mining sector. As companies in the industry seek to drive productivity, increase efficiency, and meet sustainability targets across their ESG commitments, data-driven solutions are being implemented. Rodrigo Couto, president Latam of Hexagon, said: "Major players like Vale are now seeking technology integrators who can deliver comprehensive solutions across various platforms, increasing productivity and efficiency rather than relying on single OEM suppliers."

The need for agnostic solutions is paramount as companies seek to unify their operations across the board, regardless of the legacy physical equipment on site. Hexagon's integrated approach, called the 'Power of One', seeks to deliver this. Rodrigo Couto continued: "One significant advantage of this work is the retrofitting of older trucks with

our autonomous and semi-autonomous solutions. Our agnostic approach allows us to extend the life of existing assets, reducing the need for clients to purchase new trucks."

A significant development in the technology sector for the mining industry has been the integration of Modular Mining Systems into Komatsu, which now operates as a vertically integrated business unit within Komatsu. Modular Mining Systems' principal efforts are focused on the rollout and application of their Intellimine Synergy platform, Komatsu's flagship agnostic solutions product. The company is working closely with various partners, including collision avoidance systems providers, to enhance their product offering. Jose Airton Sena, general manager of Komatsu- Modular Mining Systems Brazil, said: "Our open platform addresses the need for interoperability, allowing different systems to work seamlessly. This platform integrates various applications into a unified layer for data exchange."

One of the far-reaching implications of these technological solutions for the sector will be their impact on the nature of the mining workforce. Throughout GBR's conversations with mining industry leaders across the value chain, labor availability and skill gaps have been identified as common concerns, the result of a red hot labor market, decreasing appetite from younger generations to work in remote mining operations, and the ageing profile of much of the mining workforce. Sena from Komatsu- Modular Mining Systems Brazil, argued: "Attracting people to work in remote locations like Carajás is increasingly difficult. Our solutions help address this issue by reducing the need for on-site labor through automation... Remote operation, like our T-Remote dozer system, allows operators to work from cities, making it more attractive to potential employees."

Productivity and efficiency gains lie at the core of any technological solution for the mining sector. The size of the Brazilian market made it an attractive destination for indurad, a German company specializing in machine vision through radar technology. As pioneers in the use of non-intrusive radars to monitor and optimize mining processes, the Brazilian market is highly significant for the company. Like many newcomers, indurad's first contract in Brazil was with Vale at the Carajás complex, but it has expanded nationally since then into non-mining related markets, too,

as their technology can be applied in any material handling, such as sugar cane. Bruno Costa, executive director of indurad, discussed how harsh operating environments in parts of Brazil have made their products highly competitive, but challenges to technological adoption in the sector remain: "The mining industry is generally conservative, which is even more pronounced in Greenfield projects. There is a reluctance to adopt new technologies during the early stages of project development."

In the radar monitoring space, GroundProbe, an Australian company that is part of the Orica group, has grown exponentially in Brazil as its radar applications for geotechnical monitoring came to focus following the Mariana and Brumadinho dam disasters. The company's headcount has grown tenfold since Brumadinho, and its integration with Orica has allowed it to expand its product portfolio to inclinometers, piezometers and more geotechnical surveillance instruments. These incidents triggered a revolution in Brazil's mining sector, as increased regulatory and social pressure drove mining companies to seek advanced technologies. João Paulo Rodrigues de Magalhaes, business manager Brazil for GroundProbe, explained how the company is now doubling down on its efforts to provide best-in-class technological solutions: "We are investing heavily in AI and machine learning, particularly in crucial historical data areas. We are also focusing on remote training tools to help raise the level of expertise among our clients. We have started discussing blockchain technology and how it can be integrated into our services."

Digital practices are penetrating further into the mining value chain. Once the preserve of multinational majors, the democratization of agile digital systems for mine management and monitorization is in full swing, spearheaded in Brazil by homegrown companies. One such is Fast2 Mine, a homegrown provider of digital fleet management solutions, which has experienced rapid growth over the last decade and now commands an impressive market lead in its market. The company's operational management system covers the entire spec-

trum of mining operations. Eder Griebeler, CEO of Fast2 Mine, explained how the company's platform involved the entire mine system, from supervisors, operators, control room, and mine planning, acting as the beating heart of mine management.

The company is now beginning to replicate its impressive growth at home, where its systems are used to manage over 60 mines, in foreign markets, including Mexico, Argentina and the US. Griebeler discussed how the transition from analogue to digital mine management solutions is taking place as the economics and complexity of mining operations render them impossible for analogue solutions.

Another homegrown Brazilian software company, Minerion, which provides a digital management package for mine operations, has observed the reluctance or lack of capacity from smaller mining operations to embrace digital solutions. Minerion, which recently underwent a brand transformation after 27 years' operating as Delphi, is targeting the smaller min-

ing and aggregate markets as well as international expansion, as Ivan Pereira, CEO of Minerion, explained: "Technology is advancing across all sectors, and mining is no exception. For instance, you can now set up an automated limestone plant with 10% of the investment it would have required 20 years ago."

Brazilian entrepreneurs, with a long history in the mining industry, are turning to tech to optimize processes that they observed when in the industry. In the case of Manding Tech, the focus is on leveraging software, remote sensing and data to improve exploration and asset valuation processes. Manuel Corrêa, CEO, said: "There is much talk about the value of mining, but there needs to be more discussion on how to accurately value assets, particularly in determining the worth of a deposit. We combine basic geology and exploration techniques like mapping, drilling, and resource estimation with financial decisions related to the development of these projects." ■



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## Rodrigo Couto

President LATAM  
HEXAGON

“We aim to be technology enablers by consolidating multiple operational solutions into a single interface.”

”

### What is Hexagon's unique value proposition in the mining space?

Hexagon the global leader in digital reality, combining sensor, software and autonomous technologies, and we are the only company putting the power of an integrated digital mine in the hands of our customers.

### Can you update us on Hexagon's activities in Brazil since last year?

Since our last discussion, there has been significant momentum in data integration solutions being adopted and demanded across the industry. Major miners like Vale are now seeking technology integrators who can deliver comprehensive solutions across various platforms, rather than relying on single OEM suppliers. This trend towards OEM-agnostic suppliers highlights the necessity for integrating different systems. Safety continues to be a top priority in mining, alongside ESG initiatives. We aim to be technology enablers by consolidating multiple operational solutions into a single interface. For instance, a typical truck in a mine may have five screens, each representing different technologies. This setup divides the driver's attention and can lead to accidents. We are intent on minimizing the number of screens in the cab, significantly reducing maintenance and operational complexity.

### Can you discuss Hexagon's autonomous solutions projects in Brazil?

We have a significant agreement with a client to develop future-focused

mining project that will include semi-autonomous and fully autonomous operations. We have also introduced the 'Green Cubes' initiative to the mining industry, a metric to measure environmental impact by digitally mapping biodiversity before and after operations. This approach helps clients apply for carbon credits and ensures we contribute positively to the community and the environment. A significant advantage of Hexagon's approach is the retrofitting of older trucks with our autonomous and semi-autonomous solutions. This strategy supports cost savings and aligns with ESG objectives, allowing for sustainable operations while maintaining economic viability.

Additionally, the "mine to mill" concept is integral to the logistics strategy of our customers, enabling us to integrate the entire supply chain from the mining site to shipping ports.

### Can you update us on your tailings management solutions in Brazil?

Decommissioning of tailings dams is a sensitive and core area of activity in Brazil. Our partnership with Scania has led to the development of a new truck explicitly designed for tailings dam management, which now operates autonomously. This initiative is crucial due to the safety risks associated with tailings areas, where human presence is often restricted. We already have customers using our TeleOp solution in that environment and we aim to serve this market with

full autonomy capabilities by the end of 2025. The shift in the mining sector involves companies increasingly outsourcing material movement, allowing them to leverage external expertise. This is evident with clients who are adopting semi-autonomous or fully autonomous operations based on contractual agreements. Looking forward, the Brazilian mining sector anticipates significant investment in semi- and full autonomous solutions by 2033 to address rising demands for tailings management, which is already outpacing workforce capacity. This creates a substantial market opportunity for both delivery and autonomous solutions. By adopting these technologies, we can reduce the need for large on-site teams, which is essential given the challenges of maintaining a stable workforce in remote mining operations, such as in Pará.

### What distinguishes Brazil in terms of innovation and technology adaptation?

Brazil's mining sector benefits from a diverse industrial landscape, allowing for the application of technology developed in other sectors, such as computer science and oil and gas. Additionally, there are clusters of software expertise in Brazil that facilitate the implementation of innovative solutions in mining. R&D plays a vital role in our strategy, focusing primarily on data analytics and integrating various technologies, and a significant portion of our R&D talent is sourced and based in Brazil.

### What are Hexagon's plans for the next 12 months?

We anticipate continued growth in both semi-autonomous and fully autonomous operations. In terms of Latin American expansion, Argentina is increasing its investments in mining, especially after the shift in government, making it an interesting opportunity. We are also pursuing new projects in Chile and Peru, where there is a growing demand for efficient mining solutions. We are making substantial investments in AI and establishing smart centers to enable large companies to manage their operations more effectively and efficiently. ■



## Investing in Technology to Serve Mining Needs



### João Paulo Rodrigues de Magalhaes, Business Manager Brazil, GROUNDPROBE

“We are investing heavily in artificial intelligence (AI) and machine learning, particularly in crucial historical data areas. We are also focusing on remote training tools to help raise the level of expertise among our clients.”



### Guillaume Barrault, CEO, DYNAMOX

“We integrate various sensors, whether wired or wireless, and we have developed a thermographic camera compatible with our gateways. This allows clients using our vibration solutions to integrate additional sensors seamlessly, enhancing their monitoring capabilities.”



### Ivan Pereira, CEO, MINERION

“Small and medium-sized companies face greater challenges ...They often need high-level managing and consulting that large companies have, and we step in to help them to improve their business management with real time information and data.”



### Jose Airton Sena, General Manager, KOMATSU - MODULAR MINING SYSTEMS BRASIL

“Our open platform addresses the need for interoperability, allowing different systems to work seamlessly. This platform integrates various applications into a unified layer for data exchange.”





## Service Providers

“

Despite being a cost-sensitive market, Brazilian miners are early adopters of technology because they know it is the key to improving their overall performance.

”

Francisco Jiménez  
Country Manager  
**ORICA BRASIL**

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Image courtesy of Core Case



# Drilling, Blasting and Laboratories

## A barometer for growth

The scale of the Brazilian market, high incoming projected investments, and the country's vast unmapped potential, mean that the drilling, blasting and laboratory service providers are experiencing high times and can expect a good pipeline of business. In addition, given the scale of the Brazilian economy and projects outside mining, including in civil construction and hydroelectric projects, these companies enjoy a diversified portfolio; a significant advantage in comparison to other Latin mining markets, and an opportunity for service providers to build moats around their businesses, shielding them from the cyclical nature of the mining business.

The leading laboratory service provider in Brazil is SGS Geosol, a joint venture between the SGS and Geosol groups, a combination of international and local expertise in laboratory, drilling and testing services. The company provides a spectrum of laboratory services, including on-site analytical services through an outsourcing model for mining customers. As the market leader, SGS Geosol has exposure to the entire primary mining sector, across iron ore and gold, critical minerals, graphite, uranium and others. Guilherme Gomes, president of SGS Geosol, summed up the company's outlook on the market: "In short, from all aspects we can see through the SGS Geosol lenses, mining in Brazil shows excellent perspectives."

The unique nature of the Brazilian market, and the potential for diversification, have been key drivers of growth for Master Drilling Brasil. The South African drilling company has been in Brazil since 2000, providing expertise in underground mining. Paulo Medeiros, country manager of Master Drilling Brasil, discussed how in Brazil, the relatively small importance of underground mining across the sector has driven Master Drilling to explore opportunities outside mining: "While we focus on mining, we also explore opportunities in other sectors. For example, we are looking into small hydropower plants (PCHs), which have gained traction despite a decline in recent years due to thermal and wind power competition."

Nevertheless, its mining portfolio has grown significantly since their entry into the market, and includes major projects with companies such as AngloGold Ashanti, Vale, Nexa Resources and others. The company has focused on introducing new technologies, solidifying its lead as a provider of safe and efficient processes. This includes enhancing the autonomy of its operations and introducing new machinery specifically catering to Brazil. Medeiros said: "We are bringing to Brazil our technology company A&R, specializing in tracking missing persons, aiming to provide greater safety for workers."

Like Master Drilling, Foraco, the French drilling multinational, also entered the Brazilian market in 2000. Starting in Goiás state, the company has steadily expanded its geographic reach, providing rotary and diamond core drilling services across the leading mining states of Brazil. Foraco employs over 700 people in the country and

has set a growth target of 50% over the next three years. The company is tapping into its global network to introduce new techniques, such as reverse circulation drilling technology.

Concerns over long regulatory lead times were also expressed by Francisco Jiménez, country manager of Orica Brasil. The company employs over 700 people across three manufacturing sites in Brazil, providing blasting, mining chemicals and now investing in digital solutions to help mining companies identify and classify ore bodies. Jiménez pointed that out that the Brazilian market is an early adopter of technology, making it an attractive opportunity for service providers willing to foray outside of their traditional business lines. Orica's investment in digital solutions is tailored towards a holistic package, as Jiménez explained: "This is where Orica's digital and chemical offerings come into play—we provide tools that allow mining companies to know their ore bodies better, optimize their blasting, and improve the entire downstream operation."

Diversification has also been a source of steady growth. The company has been able to tap into new business outside of traditional mining, piggybacking on Brazilian government schemes to improve infrastructure in the country. Jiménez added: "Aggregates and construction materials are another key focus for us. The aggregate business is larger in terms of volume than traditional mining in Brazil. It is a massive industry and it is growing even faster than mining."

The aggregates market has been a source for growth for ENAEX Brasil too, a blasting and explosives company that is part of the Chilean Sigdo Koppers group. The company has also been active in small and mini hydroelectric projects. João Sorbille, ENAEX Brasil's CEO and Global Vice-President, reported the company has a 75% market share in that niche, reflecting the trend among service providers to diversify away from mining activities as a way to shield their business from commodity price volatility. ENAEX is doubling down on the mining sector too, as Sorbille explained: "We have made substantial investments, including opening Brazil's largest explosives factory in Goiás, which was chosen for its strategic location in the center of the country, close to many mining projects."

AECI Mining, the South African blasting and chemicals company, entered the Brazilian market in 2020, establishing an explosives factory in the state of São Paulo and, in 2023, expanding through M&A to operate in the strategic mining regions of Minas Gerais and Bahia. The company is targeting South American markets for further growth as their core South Africa market matures, and it has rapidly established relationships with gold and iron ore producers in Brazil. Carlos Goncalves, managing director Latam for AECI Mining, commented: "Entering Brazil came with its own challenges due to complex regulations and taxes. We adopted a cautious approach by acquiring a small explosives facility, allowing us to gradually understand local market dynamics." ■

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“

A drilling sample can be as valuable as a luxury apartment and can contain invaluable data, yet it is often stored haphazardly.

”

## Daniel Bortowski

Director  
CORE CASE

### Can you update us on the latest news?

Core Case has been busy since last year, devoting much time and energy on the development of our proprietary technology. Specifically, we have been working on the GE system, which involves our conventional core case transport cases, which are now equipped with RFID and QR code tags. These tags allow us to track the cases from the field drilling site to the warehouse's final storage. We have developed a comprehensive communications campaign to promote this product and our other offerings.

### Can you give an overview of your product lines and any new additions?

Our conventional products lineup consists of five product lines, all related to the storage and final preservation of drilling samples. We have the first-generation Case, where it all started, and the second-generation Case, our main product today. While our tracking technology can be used with other products, we are starting with the second-generation case as it is our main product. Besides these, we have the Chip Case, popular in Brazil for reverse circulation drilling. We also have a case developed in partnership with Vale for specific dimensions and characteristics they need and a product specifically for the oil and gas sector called the PetroCase. The second-generation case, equipped with tracking and tagging technology, is becoming our sixth line, the Smart Case.

### Last year, you mentioned expansion plans in the Canadian market. Can you update us on this?

Core Case has been very active in promoting our products across the Americas, and Canada is a key focus of this international expansion. We opened our first physical unit in April 2024 in Prince Edward Island. We are in the initial phase, much like we started in Brazil, focusing heavily on marketing and participating in events like PDAC. Many Canadian companies already know our product from using it in other countries like Brazil, Mexico, and Suriname, but now we want Canadian companies in Canada to know us as well.

We are also very active in Chile, with a support office and a partner company. In Ecuador, we also have a partner company. In Peru, we recently integrated a commercial representative from Lima into our team to help develop our presence there. We will participate in an upcoming trade fair in Lima with our representative. Canadians and Aus-

tralians are very practical and use whatever is available, whether wood, metal, or plastic. In South America, there is a more robust environmental focus. Our recycled plastic boxes offer a sustainable alternative to timber, addressing deforestation issues. Our Canadian customers appreciate our products' organizational and safety benefits.

### Can you discuss the importance of secure storage for mining companies?

Companies spend millions of dollars on research and drilling yet often do not store samples properly. A drilling sample can be as valuable as a luxury apartment and can contain invaluable data, yet it is often stored haphazardly. Proper storage is crucial as these samples are kept for the lifetime of the mining company for audits and reviews. Our premium products ensures proper, safe, and environmentally friendly storage.

### What are the major challenges that your product overcomes?

One major challenge is avoiding contamination. Each slot in a sample box represents a meter of drilling, and any contamination between slots can result in inaccurate data. Using materials like cardboard or wood that deteriorate can increase contamination risks. For instance, if boxes break and fall over, valuable information worth millions could be lost. Proper storage is essential to maintain the integrity of these samples for future reanalysis, possibly years down the line when economic viability might change. Innovation is key. As a geologist, I focus on developing products that solve customer problems. Currently, we are working on two products: one for reverse circulation drilling to ease usage, and another to facilitate transport, especially in countries where aerial transport is needed. These products are in advanced stages of development, and we are working on patents and prototypes.

### What are the main commercial priorities for Core Case next year?

Our priority is to increase our international market presence. We aim to double our international revenue compared to last year. We want to replicate our success in Brazil in markets like Canada, leveraging our successful products and new technology-driven products like the Smart Case to achieve this. ■



“

We can see through the SGS Geosol lenses that mining in Brazil shows excellent perspectives.

”

## Guilherme Gomes

President  
SGS GEOSOL

### Can you introduce us to SGS Geosol?

SGS Geosol is a joint venture between the SGS and Geosol groups. Geosol is a Brazilian company and a market leader in mineral research services and drilling, and has established itself as one of the largest drilling service providers in South America. SGS is a Switzerland based group with a wide spectra of services. SGS Geosol operates primarily in three main areas: geochemical laboratory services, environmental and beneficiation. We also outsource laboratory services, providing on-site analytical capabilities directly within mining operations. This allows immediate feedback on the industrial plant performance, speeding up decision-making and providing much more effective QA/QC.

### Can you give us an overview of the services SGS Geosol provides the mining sector?

We conduct geochemical tests on samples from drilling and geological exploration to determine the composition of the mineral bodies and enable effective exploration strategies. Our environmental services help clients ensure their operations are sustainable and compliant with legal requirements, thereby supporting their commitment to environmental stewardship. We conduct water quality tests that assess contaminants and other parameters essential for environmental protection. Our beneficiation lab is specialized in bench scale test work encompassing grinding, flotation, leaching, magnetic and gravimetric separation to assist mining companies define the best strategy for exploring new ore deposits, as well as enhancing their efficiency in processing existing ones. We are also specialized in pilot plant projects to give valuable insight into processing new ore types and mitigate investment risks. Our mineralogical analysis is crucial for understanding the fundamental mineral properties that control the beneficiation process, enabling our clients to make informed decisions based upon real data.

### What has been the growth trend in mining investments in Brazil?

Over the past six years, we have seen significant increases in our client requests. Brazil's mining sector tends to keep going up, diversifying in terms of commodities and geographically expanding. We see more strategic planning and robust prospects. We saw during the last years an increased demand for critical minerals. Lithium and rare

earth received the most attention. We performed various projects in SGS Geosol for these both commodities, but also, graphite, niobium, manganese, tungsten and uranium projects, as well as gold, iron, copper, nickel and others, passed here recently or are under negotiation with us. In short, from all aspects we can see through the SGS Geosol lenses that mining in Brazil shows excellent perspectives.

### How does technology play a role in your services?

Technology is an intrinsic part of our business. On account the nature of our services and what we do is a technical service, delivering data and information to support our clients. One realizes the need to continuously work with brand-new technologies to do it properly. We have invested in the most advanced equipment and software for chemical analysis to handle the vast amounts of data we generate daily. We also conduct regular evaluations to ensure our services always meet our client's needs, maintaining our competitive edge.

### What are SGS Geosol's objectives for the coming year?

We are working to consolidate all the development, new services and equipment acquired in previous years. Our head office in Vespasiano city, close to Belo Horizonte/ Minas Gerais state, is under expansion in order to support current and future growth. Diversifying our portfolio is also one of our targets. Working together with Geosol and SGS, we are developing projects and ideas for new services, bringing potential new technologies to Brazil. We truly believe that one of the main reasons for SGS Geosol success has been the transparent communication and honest relation we reached with our clients. 'Trust in the first place' is our main belief; going into the artificial intelligence era, we also understand that technology is a constant requirement for long-term businesses to survive. But we never forget that human relations and human intelligence still are the best way to solve human problems, even the technical needs for the mining industry. That said, SGS Geosol will keep investing in developing and creating opportunities for the talents in our team. This is maybe the most challenging and critical objective for near future. Through constant development of our team, we will be able to support our clients in transitioning from exploration to production while ensuring benefits for the local community and economy. ■





## Francisco Jiménez

Country Manager  
**ORICA BRASIL**

### Can you provide an overview of Orica's operations in Brazil?

Orica is a leading service provider in mining and infrastructure, focused on blasting services and explosives, and has a strong presence in mining chemicals and cutting-edge digital solutions, fully integrated across the mining value chain. Recently, we acquired Cyanco, which strengthens our position as a leader in mining chemicals, particularly gold mining. In Brazil, we have operated for over three decades, with over 700 employees spread across three manufacturing units. Additionally, we have a strong ESG strategy and have been a benchmark for diversity in the mining sector here in Brazil, moving from 11% to 25% female representation in our workforce.

### What are some of the challenges and opportunities in the Brazilian mining sector?

Regulatory and environmental requirements in Brazil can cause long lead times, which is a big hurdle. The mining sector here is also highly cost-sensitive, but paradoxically, we have seen that Brazilian miners are early adopters of new technology. They realize that to remain competitive, they need to invest in advanced solutions. Brazil is an exciting market in that sense, and despite the challenges, the opportunities are significant.

### What are Orica's main objectives for the coming year?

We are moving our headquarters to Belo Horizonte to be closer to our customers, and we are setting up a Center of Innovation there in partnership with Vale. This is a huge step for us. We have signed a technology agreement with them and will have dedicated engineers working to optimize their operations using Orica's advanced technologies. We aim to push the boundaries of what is possible in mining, making it more autonomous and digital. We are also focusing on growing our presence in open-pit mining. Additionally, we are investing in modernizing our manufacturing plants to stay ahead of the curve regarding technology and efficiency. ■



## João Sorbille

CEO and Global Vice-President  
**ENAEX BRASIL**

### Can you introduce us to ENAEX Brasil?

We are part of the Sigdo Koppers (SK) group, a major Chilean conglomerate. ENAEX operates in more than 40 countries, including Chile, Peru and South Africa. SK's activities span prospecting, engineering, mining, and material processing, as well as concessions for ports and roads in Chile. The Brazilian explosives market is approximately 300,000 t/y, with around 65% of this directed towards large-scale mining. ENAEX has a dominant market position.

### How do you see the mining sector and its potential for the future?

The surprising development in Brazil's mining sector has been the discovery of new minerals and reserves associated with the energy transition, particularly nickel and zinc. These new minerals are economically significant for Brazil, and the outlook is very promising. Scaling up requires advanced standards and technologies, especially with an international export focus. This shift is driving the industry to adopt more advanced technologies and innovation.

### What is the role of innovation at ENAEX?

Two notable innovations from Brazil include the development of a plasma-based product made from salts, which allows for safer fragmentations in urban areas with reduced risk, and the creation of electronic initiation systems with enhanced safety features designed to prevent accidental detonations caused by lightning.

### What are your goals for the upcoming year?

Our strategic planning spans five years. Our leading position brings both opportunities and challenges. We have made substantial investments, including opening Brazil's largest explosives factory in Goiás, which was chosen for its strategic location in the center of the country, close to many mining projects. We have also invested in automating processes in our factories. Our future goals include continuing to expand our presence and capabilities in the sector while maintaining a strong focus on safety, innovation, and efficiency. ■



## Carlos Goncalves

Managing Director LATAM  
**AECI MINING**

### Can you introduce us to AECI Mining's Brazil and Latin America footprint?

AECI has established a presence throughout Latin America, with a particularly significant foothold in Brazil. Our journey began in 2020 with the establishment of an explosives factory in the state of São Paulo. Last year, we further expanded by acquiring a company that enabled us to operate in the strategic mining regions of Minas Gerais and Bahia. Our diverse portfolio in Brazil includes both explosives and mining chemicals, with the latter being directly supplied from our South African factories. Our local facility produces bulk emulsion and packaged explosives, focusing primarily on local supply. As we aim to penetrate the larger Brazilian mining sector, significant investments in equipment are necessary. We are preparing to participate in major tenders with leading mining companies, showcasing our innovative products such as eco explosives emulsions, boosters (Powerboost), and wireless detonators (Cyberdet). These products are designed to minimize environmental impact and enhance safety, embodying our core values.

### What role does R&D play at AECI Mining, and how are you addressing the Brazilian market's needs?

R&D is a significant part of AECI's value proposition. We create tailor-made products for specific customer needs in challenging conditions. For instance, we have developed products that operate safely in hot hole environments, crucial for regions such as Chile and Peru. In Brazil, while underground mining is currently less prevalent compared to other areas, we see potential as more players consider expanding their underground operations. We are seeing an increasing interest in sophisticated products from Brazilian customers, indicating a shift in market readiness. We are expanding into various commodities and greener technologies, such as lead-free environments and eco emulsions. Our approach mirrors the transition from pyrotechnic to electronic detonators, which became more affordable as volumes increased. Rare earths and copper represent a key area for our future growth. ■

### Can you describe any recent projects or technological advancements at Master Drilling?

Recently, Master Drilling has been involved in the expansion of mining operations at the Mineração Caraíba – Ero copper mine, which includes constructing a large-diameter shaft for efficient copper extraction and transportation. This project aims to enhance the access and capacity for mineral transport and personnel movement. Additionally, we are introducing the LP 100, a new machine designed for specific mining applications, which is expected to enter the Brazilian market soon. We are also developing a machine to facilitate rapid excavation and construction. This innovation is crucial for maintaining high productivity.

### How do federal and regional governments impact mining operations in Brazil?

The government's impact on mining operations in Brazil is substantial and varies by region. In Minas Gerais, the political climate is favourable, with pragmatic policies that support business growth. This business-minded approach has created a stable environment for our projects and aligns with our belief that leaders with private sector experience can more effectively manage both business and governance. In contrast, Pará and Bahia present more challenging environments. Pará, which hosts significant mining operations, faces complex federal interventions. This has led to cumbersome regulatory processes, including difficulties in obtaining environmental licenses, which can hinder large-scale projects. Similarly, the political landscape in Bahia can complicate operations. Our strategy involves adapting to regional needs and regulatory conditions while carefully selecting clients and projects to protect our established reputation. This approach ensures that we effectively manage local challenges and maintain successful collaborations.

### How do you see the future of Master Drilling and the mining sector in Brazil?

The future of Master Drilling in Brazil looks promising, with ongoing projects and growth potential. Despite the challenges, we are confident in adapting and thriving in the Brazilian market. ■





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Data as at December 31, 2022. Mining capital raised from 2018-2022.  
Source: TSX/TSXV Market Intelligence Group and S&P Global Market Intelligence.

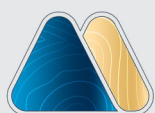
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