STATE OF THE COPPER INDUSTRY

CHILE 2024/2025

AHK Deutsch-Chilenische Industrie- und Handelskammer
Cámara Chileno-Alemana de Comercio e Industria

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A

PURPOSE OF THE REPORT AND INTRODUCTION TO THE SUBJECT

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The following report has been prepared within the framework of the project “Responsible Mining for Future Technologies”, carried out by the Chilean-German Chamber of Commerce and Industry (AHK Chile) and financed by the German Federal Ministry of Economics Affairs and Climate Action (BMWK). The objective of this document is to collect and systematize public information on the copper industry in Chile for dissemination to stakeholders in both countries.

Chile’s economy is largely based on the exploitation of natural resources: mining, forestry and agriculture, with mining being the main driver of the country’s economic development over the last 30 years. Chile has a rich mining heritage, but it stands out for its copper reserves, which amount to approximately 190 million tons, or 19% of the world’s known reserves. It is also the country with the largest reserves of iodine, nitrates and lithium, as well as deposits of molybdenum, rhenium, iron, gold and silver. Given the historical links between Chile and Germany in the field of cooperation in mining and mineral resources, AHK Chile notes that the development of the Chilean copper mining industry can offer a series of opportunities in terms of critical inputs (water, energy, sulphuric acid, lime, grinding media, etc.), innovation, automation of equipment and processes, information technologies (ICT) and human capital formation.

As Chile’s main trading partner among the member states of the European Union, Germany has an investment stock of USD 1,073 million in Chile (2022), with participation in sectors such as medicine and pharmaceuticals, mining, global services, construction, trade and industry.

Given the deep commercial ties, cooperation and friendship between Chile and Germany, German companies have found in Chile not

only a favorable and stable environment for investment, but are diversified in a significant number of sectors, driving sophistication and progress in matters that go beyond the commercial and include research and development.

In this sense, the Chilean government has decided to establish Germany as an investment promotion hub for Europe, due to its cultural and value proximity, its potential in strategic sectors and the high level of sophistication of its industry. Thus, since the end of 2022, it has an investment attaché in Berlin, whose mission is to build bridges for German companies to know in depth the opportunities and accelerate their decision to invest in Chile.

President Gabriel Boric's official visit to Berlin and München in June 2024 was part of this strategy to address the full range of bilateral and economic relations based on the opportunities offered by renewable energies and global climate protection. The meeting with the German Chancellor Olaf Scholz; the inauguration of the Ecomic Forum "Chile - Germany: Strategic Partners for Global Challenges", and the signing of the cooperation agreement between the Chilean copper company Codelco and the German state-owned company Wismut.

In order to take advantage of the comparative advantage that the country has in copper mining, the Chilean relationship with Germany could be deepened with the generation of initiatives and joint projects aimed at incorporating technological innovation, sustainability and transparent supply chains for mining and its derivative industries, for a correct energy transition. This, considering that by 2050, Germany aims to have 80% of its energy coming from renewable sources, making electromobility one of the priority areas for its development.

On the other hand, in January 2023, the governments of Germany and Chile signed a "Cooperation Agreement" (specifically between the Ministry of Mining of Chile and the Ministry of Economics and Climate Protection of the Federal Republic of Germany) to strengthen relations between the two countries in the mining and environmental sectors in the context of the climate crisis. Its purpose is to deepen bilateral relations and secure common interests through the development of a work and cooperation agenda.

Among the outstanding elements of this agreement are the establishment of thematic areas of interest that address aspects ranging from prospecting, exploration, extraction, treatment and processing of raw materials to efficient and sustainable mineral processing, with sustainable technologies for smelters. Finally, this agreement includes as a valuable element the existence of the "Chilean-German Forum on Mining and Mineral Resources", which has been actively supported by the ministries and related institutions of both countries for more than a decade.

Images: diegograndi

B

GLOBAL COPPER MARKET AND INDUSTRY OVERVIEW

Images: petero31

Copper (Cu) is a metal with a characteristic reddish color and metallic luster, with high thermal and electrical conductivity. It is malleable, which means that it can be beaten into sheets or plates; it is also ductile and can be stretched into filaments, making it an important raw material for the manufacture of cables, wires and foils. Its atomic number is 29 and atomic weight is 63.54.

Copper shows a great affinity with sulfur and is one of the most typical components of sulfide ores (pyrite, chalcopyrite); it also occurs as oxides (cuprite) and as carbonates (malachite).

It is currently one of the most widely used minerals in the manufacturing, electrical, electronic and chemical industries, especially in the manufacture of machinery and automobiles, and as a bactericidal material.

With world copper production estimated at 22.5 million metric tons ™ in 2024, the year is expected to close with an increase of 2.5% over the previous period, while global demand is projected at 26.78 million metric tons ™, up 3.6% versus 2023 (source: Cochilco).

According to the U.S. Geological Survey, in 2023 Chile led world copper production with 5.25 million MT, followed by Democratic Republic of Congo (DRC) with 2.8 million MT and Peru with 2.76 million MT. In this list, China, considered the main global consumer of the red metal, ranked fourth as a producer, by adding 1.7 million MT, however, to meet the copper demand of its construction and transportation sectors, the country relies on imports. Of course, in terms of refined copper production, China rises as the leader in world refined copper production, concentrating more than 44% of world production, with 12 million tons in 2023, surpassing by six times the production

of Chile, which is the next largest producer of refined copper.

In recent years, the Democratic Republic of Congo has rapidly increased its production and now accounts for more than 11% of the world's mining output. With many more Chinese-funded projects in the pipeline and nearing completion, Congo is on track to overtake Peru for second place in copper production. Chinese companies with a presence in Congo include CMOC Group (Tenke); Bohai Industrial Investment; Wanbao Mining; China Minmetals; China Railway Group; Chengtun Mining Group; and Zijin Mining Group, among others.

Chile is home to mining giants such as Codelco, BHP, Teck, Anglo American, Lundin Mining and Antofagasta Minerals, among others, and by 2024 the country will have seven of the world's twelve largest copper deposits (including El Teniente, Doña Inés de Collahuasi, Escondida, Chuquicamata and Los Pelambres).

Its dominant role in the world copper market means that any fluctuations in Chilean production have a global impact. For example, one of the most notable effects of the decline in Chilean supply due to lower ore grades at its mines is the reduction of copper inventories in China.

This scenario presents both challenges and opportunities. Economies dependent on Chilean copper will need to diversify their sources or find innovative alternative solutions. But it has also been a wake-up call for Chile, which has spent the last decade reviewing and improving its mining operations to ensure sustainable and efficient production in the future.

The current challenges facing Chilean copper production underscore the importance of mining to the global economy and the need for the sector to be adaptable and resilient. As nations and industries navigate this changing landscape, it is essential to stay informed and prepared for an uncertain, but promising future.

Electromobility and renewable energies are a global challenge that has the potential to redefine the economic model, offering the industry of strategic minerals such as lithium, copper, cobalt or rare earths the opportunity to make rapid and sustainable progress towards environmental protection, both in terms of recycling, energy storage and the development of new technological solutions focused, for example, on increasing the density of lithium batteries for greater autonomy of electric vehicles.

In terms of market trends that point to the massification of electromobility, the penetration rate of battery electric vehicles and plug-in hybrid electric vehicles (BEVs and PHEVs) in terms of sales continues to rise from 16.8% in 2023 to 19.8% projected for the end of 2024 (source: Lithium Market - Cochilco).

Images: gob.cl

1 WORLDWIDE PRODUCTION

World mine copper production is estimated to grow by 2.7% in 2024 to reach 22.4 million metric tons, with an increase of 582 thousand metric tons compared to 2023.
Chile produced a total of 5.25 million metric tons of copper in its least processed form in 2023. Although this total marked the lowest volume produced in two decades, the country still led in mine copper production with a 23.4% share. By 2024, Chilean copper production recorded a 4.9% growth, reaching a volume of 5.5 million tons (source: Cochilco).

It is important to note that Chile's share has decreased since 2014, when it had 31% of the world market. This is explained not only by the decrease in production in absolute terms, but also by the increase in production of Peru and the Democratic Republic of Congo, which had 8.4% and 5.4%, respectively, in 2014. In this regard, it should be noted that in the period 2014-2023, the copper production of Chilean mines decreased by an average of 1% per year, while that of Peru increased by an average of 8% per year and that of the DRC by 12.4%.

Meanwhile, world production of mined copper is projected to increase by 3.9% to reach 23.2 million metric tons by 2025. In such a scenario, it is likely that Chile will achieve a 6% growth in its production, which would reach 5.73 million metric tons, being the country that will contribute the most to the production with an additional 325 thousand tons (source: Cochilco).

Images: gob.cl

On the other hand, Chile is the world's third largest producer of smelted copper with 1.073 million metric tons (5.5%). China and Japan take the first two places with 8.6 and 1.5 million metric tons respectively.
In the field of refining, the volume of the Chilean industry reaches 2.076 million metric tons with a world participation of 7.6%, behind China with almost 13 million tons and a world participation of 47.3% (source: Cochilco).

2 WORLDWIDE DEMAND

According to its "Copper Market Trends Report", Cochilco estimates that growth in copper production is crucial to meet increasing global demand, which would reach 27.4 million metric tons in 2025, a growth of 3.2% over 2024.
By 2026, copper demand is expected to reach 28.29 million metric tons, increasing by 2.9%.

As in previous years, the increase continues to be driven by growing demand from sectors such as electric vehicles, energy infrastructure, and emerging technologies such as artificial intelligence and automation.
The largest increase in copper consumption in 2024 came from China and is associated with the production of electric vehicles, which maintains high expansion rates of over 30% and a growing market share of approximately 40%.

In 2025, although the expansion of copper consumption in China would be only 1%, equivalent to an incremental consumption of 148 thousand tons, the rest of the world would increase its consumption by 4.9%, with Europe and the United States being the main drivers of demand growth.

Images: latercera.com

3 OFFER AND PRICES

The latest trend reports prepared by Cochilco at the end of 2024 maintain the forecast of a deficit market for 2025. Supply is estimated at 27.3 million tons, an increase of 2.3%. A metal deficit of 118 thousand tons is forecast for the period.

This deficit suggests an upward bias for the price of copper, provided that geopolitical and macroeconomic conditions do not present adverse changes and progress in the energy and technological transition is maintained.

Meanwhile, by 2026, the supply would reach 28.5 million metric tons with an increase of 4.1%, generating a surplus of 210 thousand tons of the metal.

Thus, Cochilco estimates an average copper price of USD 4.25 per pound for 2025 and 2026. Although a lower growth in copper consumption is expected in China, this would be partially offset by a 4.1% expansion in the rest of the world.

These projections would be explained by the increase in copper demand due to the greater need for the mineral to supply the development of the energy transition and electricity grids, and a restricted supply. To these factors must be added persistent geopolitical tensions, uncertainty about China's economic recovery, the imposition of tariffs in the US, stagnating demand in key regions such as Europe, and the tightening of monetary policy, which could limit copper demand and affect its price (source: Cochilco).

Increased trade tensions between the United States and China, including the possible imposition of tariffs, have the potential to negatively impact industrial activity in China, which would slow demand for the red metal in one of the world's largest consumers. As a result, global political uncertainty could alter supply chains, leading to market disruptions and price volatility.

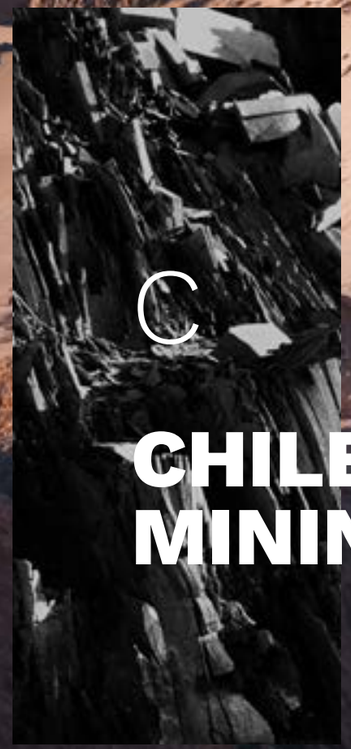
Similarly, the growth of electrification - driven by the electric vehicle and renewable energy industries - could be impacted in the short term as incentive policies in the United States and European countries risk stagnating or being reduced.

On the other hand, as in all mineral markets, the supply of resources is determined by the budget allocated to mining exploration. In 2024, 25.7% of the exploration budget was allocated to Latin America, the region with the greatest potential and mining resources, followed by Canada with 19.8% (source: Cochilco).

Finally, it is important to note that the price of copper is determined by the markets. The three main trading platforms for the reddish metal are the London Metal Exchange (LME), the Commodity Exchange (Comex, in New York) and the Shanghai Futures Exchange (SHFE) in China.

Over the last 20 years, the price of the metal has risen from USD 0.82/lb to USD 4.15/lb (2024), a growth that has been marked by the boom in emerging markets, technological development, the global recession, the COVID-19 pandemic, the decline in ore grades and the rise of renewable energy. The price outlook for 2025 will depend largely on the industrial recovery in China and the trade policy of the new US president, Donald Trump. Faced with this threat, the mining industry reiterates that everything will depend on the extent of the measures, on which there is not much light at the moment.

Images: forbes.cl/



C

CHILEAN COPPER MINING INDUSTRY

Images: petero31

Due to its economic importance, copper mining is the country's main productive activity and has therefore played a decisive role in shaping Chile's socio-economic landscape over the years, and its effects directly determine variables such as GDP and employment growth, the exchange rate, investment, tax revenues, exports, among many others.

Copper mining accounts for 8.7% of the country's GDP. The country's copper production has ranged from 5.5 million tons to 5.8 million tons over the past decade, peaking at 5.83 million metric tons in 2018.
The main players in the Chilean mining sector are the large private multinationals (Anglo American, BHP Billiton, Antofagasta Minerals, Teck, Freeport and others) which, together with Codelco (state-owned company), make up the large mining sector and account for approximately 97% of Chilean copper production.

In general, large-scale mining includes all companies with an annual production of more than 50,000 fine metric tons (FMT). Large-scale mining in Chile has an important presence that conditions the functioning of the market.

In this sense, between 1990 and 2016, copper mining contributed an average of 7.8% of Chile's fiscal revenues. The range of these revenues fluctuated between 1.6% and 20.7% due to national fiscal policies and the fluctuation of international metal prices. In 2021, for example, revenues from mining taxes registered US$9.594 billion, one of the highest collections since 2011.
By the end of the third quarter of 2024, the country's main private mining companies had increased their contributions to the Treasury by 36%. With this increase, the private mining contribution would be on track to end 2024 with payments higher than those projected by the Budget Office of the Chilean Ministry of Finance (Dipres), which estimated a collection of US$3 billion by the end of 2024. The figure could be around US$3.5 billion.

In the first half of 2024, Codelco contributed USD 655 million to the Treasury. By September, the figure had risen to US$ 1.064 billion, maintaining the annual contribution target committed to the Treasury of around US$ 1.5 billion.

According to the latest Dipres budget execution report, presented at the end of December 2024, private mining contributed more than 35% of its taxes between January and November, due to the mining royalty and the increase in the price of copper. The same happened with Codelco's resources, which increased by 7.1% between January and November compared to the same period last year.

These data confirm that copper mining accounts for nearly 7% of total revenues. Every cent that the price of copper falls has an impact on Chilean tax revenues. For every cent on the dollar that the price of the metal increases, the government's revenue increases by USD 65 million, between what the Treasury receives and what is reinvested in Codelco (source: LarrainVial Research). For this reason, the recent announcement by the U.S. of a possible imposition of tariffs on metal imports is being closely watched by the Chilean government.

Although so far only President Donald Trump's statement is known, without specifying the magnitude or the countries that would be affected, the drop in the price of copper was strongly felt after his speech, falling by 1.77% to USD 4.03/lb compared to the previous day, January 27, 2025.

Given the size of the large copper mining production, there are also segments of medium and small mining in Chile, which correspond to companies and producers with lower production, mostly with national capital and with fewer resources. Therefore, they are dedicated to the exploitation of deposits that, due to their size and structure, are not profitable on a larger scale. In general, they are more selective and focus on underground deposits with higher ore grades.

Images: Oliver Llaneza

Despite the differences in scale with large-scale mining, it is a very interesting sector, with competitive production levels and more easily accessible to suppliers. Both medium and small-scale copper mining are globally competitive. Therefore, although on a smaller scale, medium-sized mining sector is a relevant segment of demand, due to the services and equipment it requires to be competitive with larger companies with more resources.

During 2023, for example, large copper mining captured 96.1% of national production; medium mining produced 2.9%, and small mining 0.9%.

Medium-sized mining companies have difficulty accessing financing, so they work with shorter time horizons (2 or 3 years of production) and only work on their known and proven resources. Due to the risk inherent in their activity, these companies usually have difficulty accessing bank financing, so they must increase and diversify their sources of financing.
In this sense, they must take advantage of partnerships with large mining companies, which allow them to gain access to the exploitation of medium-sized deposits and to increase their own investments in exploration or through joint ventures with third parties. These companies also face significant difficulties in negotiating and exporting their products directly, so they access the international market through ENAMI, to which they mostly sell their production through purchase contracts.

Finally, in terms of the labor market, mining has an important impact despite being a capital-intensive industry, so many of its processes are automated or depend on machines for their execution. Nevertheless, the activity accounts for 10% of direct employment at the national level. Women's participation in the industry, although relatively low compared to other sectors, has increased steadily over time and now stands at 20%. The mining industry is also characterized by a high percentage of unionized workers (over 70%) and higher salaries than the national average (source: Mining Council).

Images: consejominero.cl

1 MINERAL RESOURCES

Exploration mining concessions in the 2023 period totaled 11,375,100 hectares nationwide; 2.9% less than the previous period. Mining concessions for exploitation in the 2023 period totaled 15,733,987 hectares nationwide, 5.2% less than the previous year.

Codelco holds the highest percentage of exploration concessions with 10.46%, followed by Antofagasta Minerals with 4.35% and BHP Exploration Chile with 4.29%. In total, 20 mining companies concentrate 45.48% of the total concessions, equivalent to 5,173,000 hectares (source: Sernageomin, 2023).

Regarding exploitation concessions for metallic mining, Codelco concentrates 6.11% of the total hectares, followed by Minera Escondida, Antofagasta Minerals and Doña Inés de Collahuasi in terms of copper extraction, with 2.58%, 2.52% and 1.49% respectively.

Being one of the most important mining districts in the world, Chile also has an attractive potential for mining exploration, which is highly concentrated in copper and gold. In this sense, the exploration budget in the area has been steadily increasing since 2020. In 2021, it reached USD 548 million and in 2023, it will rise to USD 833 million, with a share of the budget at the global level of 6.5%, consolidating Chile as the first exploration destination in Latin America and the fourth at the global level. Most of the exploration projects correspond to copper deposits (45%), followed by gold.

Sernageomin has an open system of geological information and exploration projects, which is very useful to observe the potential and attractiveness of the country.

Regarding the budget in Chile for exploration according to its phases, in 2023 the trend was maintained since 2019, where the highest budget allocation corresponds to the “mine” segment with 44.2% of the national budget, followed by “advanced” exploration with 31.7% and “basic” with 24.7%. On the other hand, the budget for basic exploration has been on the rise since 2020, but had a lower growth last year compared to the 15.7% it experienced between 2020 and 2021.

Images: soletanche-bachy.cl

2 PRODUCTION

With 19% of the world’s known copper reserves, Chile leads the world’s mine copper production, but after reaching its highest point in 2018 with 5.83 million tons, mine production began a downward trend that continues to this day. In 2023, the country produced 5.25 million tons, a decrease of 330,000 tons compared to the previous year (0.1%) and the lowest volume of the entire period observed.

Cochilco projects that expected copper production in Chile will reach 5.54 million tons in 2034, representing a growth of 5.6% over actual production in 2023. Peak production would be reached in 2027 with 6.07 million tons of copper (source: “Projected Copper Production in Chile. Period 2024-2034” - Cochilco).

Chilean copper mining takes place mainly between the Tarapacá and O’Higgins regions, where almost all the known reserves of its rich geology are concentrated.

In the national accounts, copper mining activities range from the extraction of the mineral to its refining, regardless of the metallurgical process used. In general, two metallurgical processes are distinguished for the extraction of copper in its pure state, depending on whether the ore is of the oxidized or sulfide type.

Images: Pexels

Images: Pexels

The oxidized ore, which is found in areas closer to the surface and therefore has a higher oxygen content, undergoes a hydrometallurgical process that includes the stages of ore leaching, solvent extraction and electrowinning to produce the electrowinning copper cathode (EW cathode) with no other marketable intermediates.

On the other hand, the sulfide mineral, which is found at greater depths and contains a higher amount of sulfur, is subjected to a pyrometallurgical process that includes flotation, smelting and electrolytic refining stages to produce the final product, the electro-refined copper cathode (ER cathode), and the intermediate products, copper concentrate (after the flotation stage), blister copper and copper anodes (after the smelting stage).

The Chilean mining industry is currently undergoing a process of adjustment in its operating methods due to the aging of its deposits, the scarcity of water and regulatory materials, among other factors. In addition, the decline in the country's refined copper production, a trend that began in 2009 when it reached 60% of total production, is expected to continue over the next decade, with concentrate production taking an increasing share.

This is due to the depletion of leachable oxide ore reserves and the consequent reduction in solvent extraction and electrowinning (SX/EW) operations, as well as the absence of new smelting and concentrate refining projects in the country.

In order to change the trend of this scenario, there are pilot projects under development for the chloride leach process that could be used for low grade sulfides.

3 EXPORTS

55% of Chile's total exports to the world correspond to mining products and more than 82% of the country's mining exports correspond to copper (copper ore, refined copper and unprocessed copper). Therefore, the dynamics of demand and price of the metal in the international markets have a direct impact on the Chilean exchange rate, pushing it down in times of mineral boom and vice versa.

According to Chile's Foreign Trade Report, total exports in 2023 reached USD 94,937 million, with copper sales representing almost 46% with USD 43,433 million under an average price of 384.8 ¢/lb.

Of the total, USD 24,322 million was attributable to shipments of copper concentrates, USD 16,955 million to the sale of cathodes and USD 2,156 million to other types of copper.

Images: www.reuters.com

According to the latest annual data from the Central Bank, by 2024 copper exports had already increased by 17% to US$ 50,858 million, almost half of the total value of domestic shipments, strongly influenced by the 30% increase in concentrate sales, which reached USD 31,551 million. This performance was achieved with a metal price that averaged 414 ¢/lb. And the main buyers of Chilean red metal in the third quarter were China (51.3%), followed by the United States (11.3%) and Japan (11.1%).

It is important to note that the mining industry has a broad reach within the supply industry, with more than 6,300 companies engaged in support services, equipment and supplies, contractors, and engineering and consulting services. These companies export both goods and services. The main exported goods are: grinding media for ores (especially for the Latin American market) and ammonium nitrate; while the main exported services are: engineering for extractive copper mining facilities, engineering for extractive non-metallic mining facilities, engineering for copper metallurgy facilities, consulting applied to mining, and engineering for electric power plants.

Images: aumund.com

4 INVESTMENTS

Mining plays an important role in foreign investment in Chile. According to the Central Bank, in 2023 this sector contributed 25.81% of the passive direct investment stock, making mining the first sector to receive foreign investment, followed by electricity, gas and water (14.80%).

The latest Cochilco report “Investment in Chilean Mining: Project Portfolio 2024 - 2033”, which considers the projects that mining companies plan to materialize in the next decade in the country, includes 51 total initiatives valued at $83,181 million dollars, an amount that is 26.6% higher than in 2023, making it the highest in the last ten years (source: 2024 Report downloadable at this link https://www.cochilco.cl/web/inversion/).

According to the cadaster, 64.5% of this investment comes from Chilean capital, with significant participation from Codelco, El Abra and Antofagasta Minerals; followed by Canada with 10%, led by companies such as Teck, Capstone Copper, Los Andes Copper and Kinross, the first two being responsible for a large part of Canadian investment. Japan ranks third with 5.7% of investment, led by conglomerates such as Sumitomo Metals and Mitsubishi Corp. Australia ranks fourth with 5.2%, with BHP Billiton as its main representative.

The portfolio is dominated by copper mining with USD 52,224 million of initiatives related to copper concentrates and USD 19,065 million related to SX-EW cathode production.

Short and medium term projects amount to USD 42,955 million, representing 51.6% of the portfolio.

It is important to note that this register does not include the USD 13.7 billion investment that BHP announced in November 2024 for its operations in Chile. Of this amount, 78% would be destined to increasing production at Escondida, while the other projects that will be intervened with financial capital would be operational by 2030, once the permitting phases have been completed. In terms of foreign investment in mining, Chile stands out as one of the most attractive destinations due to its advanced and strategic infrastructure, especially in transportation, energy and water supply, adapted to support one of the largest mining industries in the world.

According to the Capital Goods Corporation (CBC), between 2024 and 2028, 33.4% of investments in Chile will be allocated to the mining sector. The 88% will correspond to private initiatives and the remaining 12% to public mining (source: Quarterly Report CBC Mining Sector, see https://n9.cl/49hi7).

Images: www.mining.com

D

STAKEHOLDERS AND MINING OPERATIONS

Images: SteveAllenPhoto999

1 PRIVATE MINING COMPANIES

The main players in the Chilean mining sector are the large private multinationals that make up the large-scale mining sector (together with the state-owned company Codelco) and account for 70% of copper production. These are mining companies such as BHP, Angloamerican, Glencore, KGHM or Lundin Mining. Among the largest are:

Images: www.mining.com

BHP Billiton: The world's largest copper producer. Headquartered in Australia, responsible for copper, zinc, uranium, gold, silver and nickel operations located in Chile, Peru and Australia. Its operations in the Andean country are: Minera Escondida in Antofagasta, the second largest copper producer in Chile after Codelco, with 18% (it holds 57.5%; while Rio Tinto, of English capital, holds 30%; Jeco Corporation, 10%; and Jeco 2 Ltd. 2.5 %). On the other hand, it owns BHP Billiton Pampa Norte (100%) with two operations, Cerro Colorado and Spence, both located in the north. It should be noted that both BHP Pampa Norte and BHP Escondida are partners in the Consejo Minero.

Its Chilean operations are:

• Minera Escondida: BHP is the operator and main shareholder of the world's largest copper mine. It is located in the Antofagasta region. BHP shares ownership with Anglo-Australian mining company Rio Tinto and JECO, a consortium of Japanese companies. In 2021 Escondida produced 1.01 million tons of copper.

• Pampa Norte: Wholly owned by BHP, operates two mines in Antofagasta and Tarapacá, which produced 203 million tons of copper in 2021.

Images: www.nytimes.com

Anglo American plc: A global and diversified mining company with operations in Southern Africa, South America, Australia, North America, Asia and Europe through its mining operations, growth projects, exploration and marketing activities. Present in Chile since 1980, it currently has three operations near Santiago that would form the Anglo American Sur Division: El Soldado and Los Bronces, fine copper operations, and the Chagres smelter. In all of them, its shareholding is 50.1 % (in both of them, 29.5 % belongs to Inversiones Mineras Becrux and the remaining 20.4 % to Mitsubishi Corp.) It also owns 44 % of Compañía Minera Doña Inés de Collahuasi (44 % is owned by Glencore and the remaining 12 % by JCR, a Japanese consortium led by Mitsui Co. Ltda.), located in the north in the Tarapacá Region.

Operates three mines and a smelter in Chile:

• Minera Doña Inés de Collahuasi: Anglo American owns 44% of this company where it is a partner of Glencore, a Swiss-based company, and JCR, a consortium of Japanese companies. It produced 630 tons of copper in 2021.

• Anglo American Sur: Operates Los Bronces mine in the Metropolitan Region and the El Soldado mine in the Valparaíso Region, as well as the Chagres copper smelter. Anglo American owns 50.1% of this subsidiary, in which it is a partner with Japan's Mitsubishi and a consortium formed by Codelco and Japan's Mitsui. In 2021, it produced 412 tons of copper.

Images: www.emol.com

Teck: Canadian company with interests or ownership in mines located in Canada, the United States, Chile and Peru. It is present in Chile through the operation of the copper mines Quebrada Blanca (60%, 30% owned by Sumitomo Metal Mining Co. and Sumitomo Corporation, and the remaining 10% owned by Codelco since 2024), in the Tarapacá Region and Carmen de Andacollo (90%, the remaining 10% owned by ENAMI), in the Coquimbo Region, and the new project to expand production, Quebrada Blanca Phase 2.

It operates the Quebrada Blanca deposits in the Tarapacá Region and Carmen de Andacollo in the Coquimbo Region.

Images: www.theglobeandmail.com

Antofagasta Minerals (AMSA): It is the main private Chilean mining company, the fourth largest copper producer in the country and ninth worldwide. It is the mining subsidiary of Antofagasta PLC, which is listed on the London Stock Exchange and 65% owned by the Luksic group.

AMSA is in charge of the operation of four mining companies: Minera Centinela (70 %, the remaining 30 % belongs to Marubeni Copper Holdings Limited), created in June 2014 through the integration of Minera El Tesoro and Minera Esperanza; Minera Los Pelambres (60 %, 25 % owned by Nippon LP Resources BV, and the remaining 15 %, to MM LP Holding); Minera Zaldívar (50 %, the remaining 50 % owned by Barrick Gold); and Minera Antucoya (70 %, the remaining 30 % owned by Marubeni Corp.). Among the projects planned by the holding company, the following stand out: Minera Los Pelambres Complementary Infrastructure Project (INCO); Operational Adaptation Project (PAO), part of the Los Pelambres Futuro initiative; Nueva Centinela; and Twin Metals Minnesota (MM).

Images: www.latercera.com

Glencore PLC: Company formed by the merger of Glencore and Swiss Xstrata. It is one of the world's largest diversified natural resources companies, a leader in the production and marketing of more than 90 commodities with operations in more than 50 countries. In Chile, it operates through Glencore Chile S.A. and has the following mining operations Compañía Minera Lomas Bayas (100%) and Complejo Metalúrgico Altonorte (100%) in Antofagasta, Minera Altos de Punitaqui (100%) in the Coquimbo Region and the aforementioned 44% of Doña Inés de Collahuasi.

Images: Swionews.com

2 STATE OWNED COMPANIES

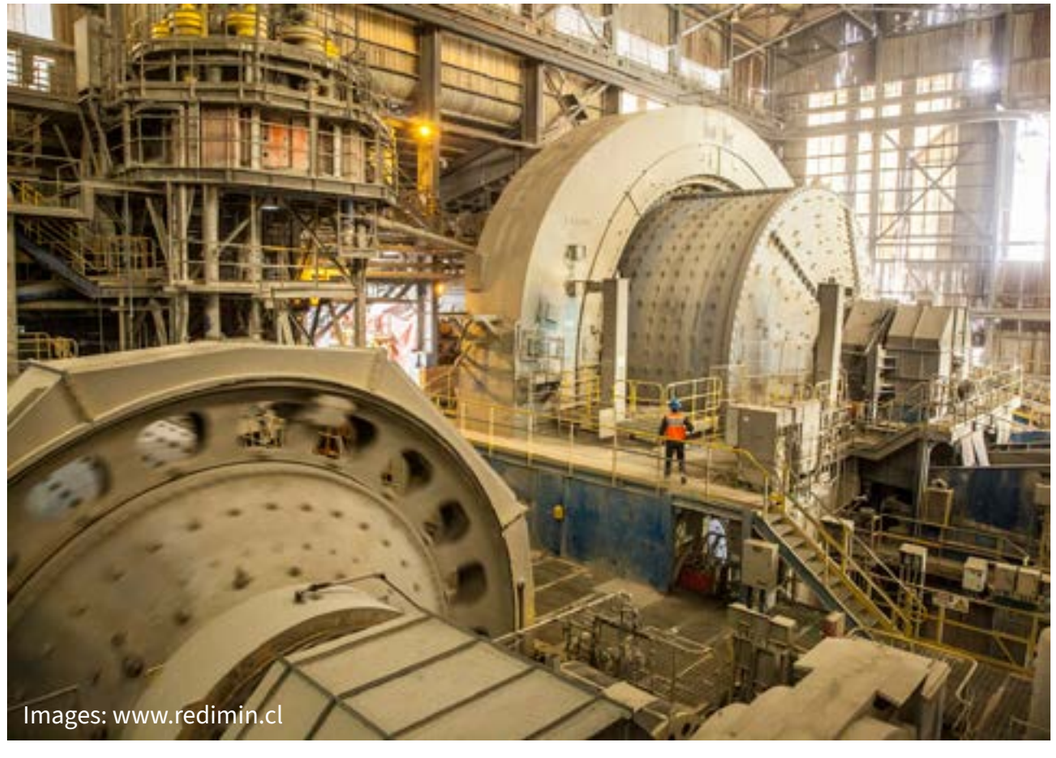
CODELCO

A 100% state-owned company, Codelco has the highest level of copper reserves and resources known on the planet, representing one third of the country's total copper resources contained in world-class deposits. Thus, Codelco's estimated mineral resources allow it to project its exploitation for more than 70 years, which shows the strength of its mining base (see Annual Report 2023 here https://n9.cl/m8s5yz).

Until 2023, it remained the largest copper producer in the world, with its own production of 1,324,554 fine metric tons (FMT) of copper and a total production of 1,423,785 fmt. Its main activities are the exploration, development and exploitation of mining resources, processing them to produce refined copper and by-products, and marketing them to customers around the world.

Since the historic process known in Chile as the nationalization of copper in 1971 and until 2023, it has made contributions to the State of Chile of USD 158 billion (in 2023 currency).

It has commercial offices in the United States, China, Singapore and United Kingdom, as a representative office in Europe. Codelco operates in seven mining divisions in Chilean territory: Chuquicamata, Ministro Hales, Radomiro Tomic, Gabriela Mistral, Salvador, Andina and El Teniente, in addition to the Ventanas Refinery.


Images: www.redimin.cl

Images: steuler-tecnica.com

Chuquicamata: Located in the Antofagasta region, at an altitude of 2,870 meters, the deposit produced 248,495 metric tons of copper in 2023. After more than 100 years of open-pit operations, in 2019 it was transformed into a underground operation to reach the mine's deepest reserves. Part of the concentrates produced at Chuquicamata are refined at a complex attached to the mine.

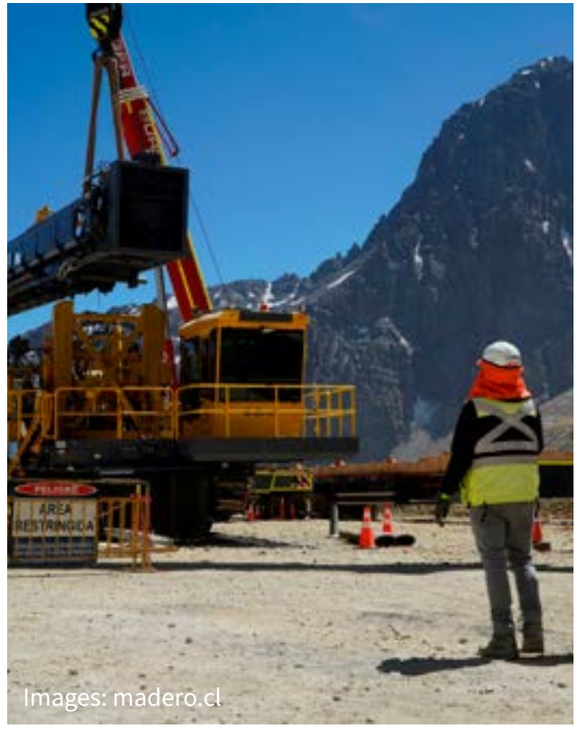
Images: madero.cl

Radomiro Tomic: The mine, located near Chuquicamata, produced 314,805 tons of copper in 2023. Part of its mine production (leachable ore) is transformed into cathodes obtained through solvent extraction and electrowinning, while the rest (sulfides) is sent to the Chuquicamata concentrator for processing.

El Teniente: Located in the Andes Mountains of the O'Higgins Region, between 2,200 and 3,200 meters above sea level, it is the largest underground copper mine in the world. It produced 351,874 tons of copper in 2023, which were transformed into anodes at Caletones, the smelter linked to the mine, in addition to 8.2 tons of molybdenum and 114 tons of silver.

Images: www.normet.com

Andina: Mine located in the Andes Mountains of the Valparaíso region, between 3,700 and 4,200 meters above sea level. It has underground and open pit operations. In 2023, it produced 164,545 tons of copper.



Images: madero.cl


Images: www.mch.cl

Ministro Hales: Located near Chuquicamata, it produced 126,010 tons of copper in 2023.


Images: www.codelco.com

Salvador: Located at an altitude of 2,600 meters in the Atacama Region, it is the smallest of Codelco's operations. In 2023 it produced 13,000 tons of copper.

Gabriela Mistral: Located in the Antofagasta region, this operation produces copper cathodes obtained by solvent extraction and electrowinning. It is the only mine in Chile with a fully autonomous truck fleet. In 2023, it produced 105,825 tons of copper.


Images: www.mch.cl

ENAMI

It is the company for the promotion and development of Small and Medium Mining of the State of Chile. Its objective is to promote the development of small-scale mining by providing the services required to access the international market under competitive conditions.

ENAMI has different lines of support, has various technical and financial support instruments, and in turn provides loans to metal and industrial mining producers with viable projects. On the other hand, it purchases the production of minerals from small mining companies and copper concentrates from medium sized ones.

Minerals are also processed at the company's five processing plants located between the Antofagasta and Atacama regions. Meanwhile, marketing involves supporting small and medium-sized mining producers by negotiating their production directly with brokers in futures markets.


Images: www.sonami.cl

E

LEGISLATION

Images: SteveAllenPhoto999

In Chile, legislation establishes that the State is the absolute owner of the country's mineral resources and may grant concessions for their exploration or exploitation, with the exception of liquid or solid hydrocarbons, lithium and other minor minerals.
The concession is granted through a judicial resolution and not through an administrative act. Among the main aspects of the Mining Concessions Law, which is governed by the Mining Code, it is established that:

• Mining concessions are real property rights; different and independent from the surface property domain, even if they have the same owner.

• They are governed by the same civil laws as other properties, and are therefore transferable, as well as subject to mortgage.

• Concessions may be granted for all metallic and non-metallic mineral substances, including those existing in the subsoil of maritime

Images: Reuters

waters subject to national jurisdiction that have access by tunnels from land.

• In addition, it is possible to grant mining concessions for mineral substances contained in waste, slag or tailings, abandoned by their owner.

• Any interested party may constitute a mining concession.

• The law does not allow concessions for liquid or gaseous hydrocarbons or lithium.

• Mining concessions will be granted by resolution of the ordinary courts of justice, without the intervention of any other authority or person.

• The discoverer will be the person who first initiates the procedure for the constitution of a mining concession.

• The holder of a mining concession has property rights over it protected by the Constitution.

The mining concession is governed by the Political Constitution of the Republic, by the Organic Constitutional Law on Mining Concessions (No. 18,097), by the Mining Code and its Regulations, and by other civil provisions in force that do not contravene the aforementioned provisions.

There are two types of mining concessions: exploration and exploitation concessions.

The registration process for an exploration concession begins with an application filed with the Court of Appeals of the municipality where the midpoint of the area of interest is located, for the application to be sent to the Court of First Instance. From that moment on, a series of procedures begins, ending with the registration of the resolution establishing the concession.

The exploration concession has a duration of two years, as from the issuance of the resolution declaring it constituted. However, before the expiration of such term, the concessionaire may request a one-time extension for another period of up to two years, counted from the end of the first period, provided that it abandons at least half of the total area granted.

On the other hand, the exploitation concession has an indefinite term. Its holder is the owner of all the mineral substances extracted and which are subject to a concession on the date on which the concession is legally constituted. In addition, they involve an annual advance payment of a patent to the General Treasury of the Republic.

It is important to note that the use of water necessary for the exploration, exploitation or treatment of mineral substances will be subject to the provisions of the Water Code and other applicable laws. Likewise, the law does not discriminate between national or foreign investors.

During the process of constitution of mining concessions, the competent judge is permanently supported by Sernageomin, an institution that, through the Mining Property Department, assists technically by issuing mandatory and non-binding reports on the matter. In these reports, Sernageomin supports the procedure for the constitution of the mining concession by informing on the technical aspects and, in particular, whether the application and the accompanying plan comply with the law. Likewise, on the shape, dimensions and orientation of the surface face of the requested concession, and whether it is included in the requested land.

The same Department of Mining Property also keeps the National Cadaster of Mining Concessions, which includes, among other mentions, the coordinates of the vertices determined in U.T.M. projection referred to the South American Provisional Datum La Canoa 1956 (PSAD 56) and to the South American Datum Chua, Brazil 1969 (SAD 69).

It is important to highlight the duration and extinction of mining concessions, as indicated in Title IV, articles 17 and 18 of the Constitutional Organic Law No 18.097 on Mining Concessions, which establishes that:

• The exploration concession may not have a duration of more than four years and the exploitation concession will have an indefinite duration as long as the associated mining patents are paid.

• The mining concessions expire, extinguishing the domain of the holders over them: a) By judicial resolution declaring the land free, if there are no bidders in the public auction of the judicial proceeding originated by the non-payment of the patent; b) By not requesting the concessionaire the registration of its concession within the term indicated in the Mining Code.

• Mining concessions are also extinguished by resignation of the holder in accordance with the Law.

Images: www.bloomberg.com

INFO-BOX MINING ROYALTY

On August 10, 2023, Law No. 21,591 on Mining Royalty was published in the Official Gazette, effective as of January 1, 2024. The law establishes that the new Mining Royalty tax consist of two components: The advalorem component and the mining margin component. The advalorem component corresponds to 1% of copper sales and applies to miners whose copper sales represent more than 50% of total sales. The mining margin component applies a rate of between 8% and 26% on mining operating margins in the range of 20% to 80%. The compound base of the mining margin component is determined in a similar manner to the Specific Tax on Mining Activities (IEAM) in force until December 31, 2023. In addition, the regulation establishes a Maximum Potential Tax Burden, which will adjust the Mining Royalty tax, in the event that it exceeds 46.5% of the Adjusted Taxable Mining Operational Income.

Images: www.nostalgica.cl

1 SOME CONSIDERATIONS ON CHILEAN ENVIRONMENTAL LEGISLATION

In Chile, the Environmental Impact Assessment System (SEIA) works as an environmental management instrument for the evaluation and prediction of the environmental impacts that may be generated by projects and activities carried out in the territory and that, according to the law, require to be evaluated.

This means that any project or activity likely to cause environmental impact, including its modifications, can only be executed or modified after an evaluation of its environmental impact through the presentation, as appropriate, of an Environmental Impact Statement (Declaración de Impacto Ambiental (DIA) in Spanish) or an Environmental Impact Study (Estudio de Impacto Ambiental (EIA) in Spanish).

Submitting a project or activity to the SEIA allows to prove compliance with the applicable regulations and to obtain the respective environmental authorizations. In the case of EIAs, it also makes it possible to determine whether the project or activity is responsible for the environmental effects it generates, through the application of appropriate mitigation, remediation and/or compensation measures.

The law also establishes that the Regional Environmental Directorates may decree the implementation of citizen participation processes if the project generates environmental impacts in the communities near the project. It also allows any person, natural or legal, to access project information and submit comments on the EIA to the competent authority. The regulations on citizen participation include the Indigenous Consultation, for which the provisions of Article 6 of Convention 169 of the International Labor Organization (ILO) apply.

The Chilean government is currently discussing in Congress a bill to reform Law No. 19,300 and modernize the SEIA in order to prevent environmental impacts, strengthen citizen participation and ensure its efficiency. The main objective is to provide certainty and improve processes in order to reduce processing times without reducing the environmental protection standards of the evaluation.

In line with the environmental regulations established by the Chilean government, in 2012 the Law for the Closure of Mining Sites and Facilities was enacted. This law specifies the aspects involved in the closure of a mine, introduces post-closure audits of the site and establishes the obligation of a guarantee to ensure the closure plan, the amount of which will be determined proportionally to the estimated cost of executing the plan. It also creates a post-closure fund with resources from the mining company and establishes stricter sanctions in case of non-compliance with the regulations.

Images: www.mining-technology.com

F

NATIONAL SMELTING AND REFINING STRATEGY

Images: Galyna_Andrushko

Although Chile has the second largest number of smelters and is the second largest refined copper producer in the world, after China, the direct costs of its smelters are four times that of China. Most of the Chinese smelters are in the first quartile and well below the world average, unlike Chile, which in 2022 was above the third quartile for 6 of its 7 smelters active at that time. All of them exceeded the world average of USD 139 of direct costs. Today, Chile has only five smelters in operation.

Faced with the loss of leadership of the Chilean industry in the production of refined copper, with the consequent decrease in the control and traceability of emissions of more than half of the copper extracted from national mines, the Chilean government set itself the strategic challenge of recovering its smelting and refining capacity (FURE), considering a nominal smelting capacity of 5.78 million MT in 2023.

Images: Galyna_Andrushko

For this purpose, in July 2023 the Chilean government presented the National Strategy for the Strengthening of Smelting and Refining Capacity, available at the Ministry of Mining website https://n9.cl/fb01d

In addition to an in-depth diagnosis of the current situation of the industry, within the framework of the opportunities for Chilean mining as an ally of the global energy transition, the document brings together the socio-environmental, geopolitical and economic considerations and assessments that would justify addressing an increase in FURE capacity. To this end, it defines proposals and a roadmap.

1 FURE PROPOSALS

The National Strategy for Strengthening Smelting and Refinery Capacity is the government's response to the need to provide sustainability to Chile's current smelting capacity and promote new smelting and refining projects to reduce global GHG emissions, improve the copper traceability process with a low carbon footprint and generate greater added value. This would strengthen the local productive chain, encourage the development of new technologies and improve the competitiveness of Chilean business.

In addition, the increasing proportion of complex concentrates, i.e., with higher arsenic content - and which are currently subject to penalties during the commercialization stage - does not allow the country to ensure that they will be received in the future in foreign smelters or even be transported for processing abroad.

And from a geopolitical point of view, the strategy aims to react to the dependence on foreign smelters which, in the future, could threaten the leadership of the Chilean mining industry. This phenomenon would be due to the lack of investment in metallurgical plants, leaving a strategic part of the copper value chain in the hands of third parties.

Considering the construction and operation of new FURE units in Chile and given that the regulations will become more and more demanding in each updating process, the strategy proposes that these should have the best available technologies to capture polluting gases and reduce GHG emissions. Additionally, it is expected that they can have significant levels of copper recovery, competitive direct costs and have the best available technologies in sight, in order to match their peers in Germany, Japan and China.

This initiative has three objectives:

1. To have a FURE industry in line with today's challenges.
2. Strengthening state capacity.
3. Development of new smelting and refinery projects in Chile.

2 FURE INDUSTRY IN LINE WITH CURRENT CHALLENGES

The strategy proposes to work on the creation of enabling conditions to strengthen the local ecosystem around the FURE industry. To achieve this, it suggests the following initiatives:

A. National Agreement for the strengthening of the FURE industry: Seeks to establish a commitment, between the private sector and the State, to progressively and responsibly advance in the improvement of the environmental performance of the smelters, establishing goals and initiatives for each of the operational FURE units.

B. Regulatory Adequacy Plan for a sustainable FURE industry: Process of reviewing current regulations, with the objective of promoting modifications that improve the socio-environmental sustainability of the industry and promote business models with a focus on circular economy and just transition.

C. Promotion of transparency and access to information: State commitment to promote the strengthening of the integrated air quality monitoring network and access to online information.

D. FURE Technological Program: Development of a FURE R&D&I program, framed within the Mining Sector Technological Plan currently being developed by the Ministry of Mining, with the objective of increasing

processing capacity in a more cost-efficient and environmentally responsible manner.

E. Promotion of the formation and training of Human Capital FURE: Development of a formation and training program for professionals and technicians of the sector that responds to the needs of the industry and to face technological change.

F. FURE diffusion and information initiatives aimed at the public: Information sharing process to highlight the strategic importance of the FURE industry and strengthen the capacity for citizen involvement and participation in the projects.

Images: gob.cl

3 STRENGTHENING STATE CAPACITY

This proposal considers both the technological upgrading of the current units and the construction of new units, with the objective of maintaining the state's smelting and refining capacity over time.

ENAMI will be entrusted with leading a project to increase smelting and refining capacity in Atacama. The company currently has a project at the study level for the modernization of the Hernán Videla Lira smelter in Atacama.

Codelco must ensure that its smelting and refining capacity is maintained or increased. In addition, the state-owned company is expected to support the construction of a new smelter or participate in the development of new FURE projects.

4 DEVELOPMENT OF NEW SMELTING AND REFINERY PROJECTS

The State will seek the construction and commissioning of one or more new smelters in Chile through a public-private partnership. It will promote the construction of a new FURE with a capacity of at least one million tons, meeting the highest standards of productivity and environmental protection. To this end, it defines the following necessary lines of work:

A. FURE Investment Incentives: Design or use regulations and instruments that encourage investment.

B. Certification of refined copper in Chile: Create conditions for the traceability and certification of minerals and metals produced in the country.

C. Pre -identification of potential locations for new FURE units: The State will identify and make available to the public areas that are attractive for the installation of new FURE units, seeking to optimize operating costs and minimize socio-environmental impacts. This process shall take into account a strategic environmental assessment.

D. FURE Roadshow: An international tour to promote this strategy and generate interest among relevant stakeholders.


Images: gob.cl

G

CHILE-GERMANY COOPERATION OPPORTUNITIES

Images: wirestock

The visit of the German Chancellor in January 2023 and the Chilean President's visit to Germany in June 2024 confirm that strategic alliances between governments and the strengthening of public-private articulation contribute to explore new ways to learn from German knowledge and improve mining processes in the Chilean mining industry.

This includes everything from new exploration techniques to the use of renewable energies, with a special focus on the smelting industry, which can be strengthened through German experience in high environmental performance technologies, the treatment of electronic scrap, the recovery of a wide variety of metals and the manufacture of high value-added products.

One point of interest for future German investment in Chile is the launch of the process of developing a national strategy for critical minerals in March 2025. The

Images: gob.cl

Chilean government has commissioned studies on geological potential, demand and the geopolitical context from the Chilean mining public institutions (Cochilco and Sernageomin), which will form the basis of the national policy.

In addition to capitalizing on the growing demand for mining products for energy transition, food security and global carbon neutrality, this initiative is seen as key to diversifying Chile's economy and attracting new investment. At the same time, international treaties and the status of suppliers will be reviewed to ensure sustainable sourcing.

Throughout 2025, citizens will be involved, and work will be carried out with industry, academia and communities, with a focus on achieving a transversal and flexible strategy.

In relation to the circular economy and secondary mining promoted by sustainability policies and environmental management in line with ESG criteria, the by-products generated by mining activities are a source of assets for these processes. In this regard, opportunities can be identified to harness the value of passive or non-traditional elements, as well as tailings, for the manufacture of construction products, soil remediation, smelter emissions capture, recycling and others.

Of these initiatives, the one with the greatest immediate potential is related to tailings, toxic waste generated as a residue from mineral processing at sites near mine sites. According to the latest cadaster published by Sernageomin (2023), there are a total of 795 tailings in Chile, of which 15 are under construction, 128 in operation, 475 inactive and 176 in a state of abandonment, located in 9 of the country's 16 regions.

Images: mineravallecentral.cl

Abandoned tailings pose a high risk to neighboring communities and often reach large dimensions, making possible mitigation measures difficult. With the purpose of promoting a comprehensive and responsible management of these wastes and fostering the circular economy, among other matters, the government launched the Tailings Agenda 2025/2026 in January 2025, with three lines of work and seven specific actions with an emphasis on ensuring the protection of communities from its construction to its final closure (see here agenda www.minmineria.cl/agendarelaves).

On the other hand, the Chilean mining sector presents a range of opportunities with respect to critical inputs (water, energy, sulfuric acid, lime, grinding media, etc.), innovation, automation of equipment and processes, information technologies (ICTs), and human capital formation.

It is important to note that the scope of the mining sector is extensive because the production process necessary for the elaboration of a copper cathode is very broad and requires from geological services to cleaning and catering services for the mining camps built specifically for the workers next to the mining sites. In this sense, the industry associated with mining activity generates a broad and diverse business network. The sector's own trade fairs, Exponor (to be held in June 2026 in Antofagasta - www.exponor.cl/) and Expomin (with calendar 2025 scheduled for April 22-25 in Santiago - www.expomin.cl/), are a clear example of the different types of companies that form part of this network every year.

In recent years, the copper mining supply industry has become an asset of global interest, although traditionally supply for the development of mining activity has focused on the purchase of goods, generally from suppliers in the region, and with little contracting of external services.

However, the global trend to outsource complementary functions in favor of greater specialization has broadened the range of supply, offering the sale of services as a recurring and growing practice. In this respect, the high dependence of mining companies on external services stands out, as the outsourcing of services is accompanied by the outsourcing of goods and inputs.

Finally, before considering the possibility of collaborating or investing in Chilean territory, it is important to bear in mind that, although Chile does not usually offer subsidies or financial incentives, there are some advantages that investors in the mining sector can take advantage of. Among them are the following:

• **VAT Exemption on Import of Capital Goods:** The importation of capital goods for investment projects in excess of USD 5 million is exempt from customs duties and 19% value added tax (VAT). These benefits, which must be processed by the Ministry of Finance, apply to goods, spare parts, accessories, parts and other components. The goods must have a useful life of at least three years.

• **Research and development law:** This legal tool aims to encourage investment in R&D through tax benefits. In 2012 a series of amendments were introduced to the law, which will be in force until December 31, 2025 for any sector, including mining. The regulation establishes a tax credit of 35 % against the First Category tax (corporate income) on the amount invested in R&D (with a cap of 15,000 UTM per taxpayer, equivalent to approximately USD 1 million), while the remaining 65 % may be considered as an expense to generate income. The law includes both internal R&D expenses and those incurred in outsourcing. It covers both capital and ongoing expenses and includes intellectual property expenses. Projects must be certified by Corfo. The incentive is complementary to other public financing.

• **Free trade zones:** Chile has three free trade zones, two of which are important for the mining sector: the Iquique Free Trade Zone (Zofri), located in the capital of the Tarapacá region, and the Tocopilla Free Trade Zone (Zofrat), with a special focus on mining.

Zofri, in addition to its original facilities dedicated mainly to commercial logistics, includes the Alto Hospicio business park. Alto Hospicio, located on the outskirts of the city of Iquique, is conveniently located as it connects the routes to the region's main mining operations with Chacalluta, in the Arica and Parinacota region, a few kilometers from the Peruvian border. Corfo, its main shareholder, has identified opportunities in the free trade zone for the manufacture and maintenance of mining machinery and spare parts, as well as for other mining services. Zofrat is an export processing zone located in the port of Tocopilla, in northern Antofagasta. It was created for the production of mining inputs, parts and pieces. Zofrat's tax benefits were recently extended until 2035.

1 INVESTMENT/SUPPLY

A key feature of Chile's mining industry that is conducive to attracting investment is its robust, state-of-the-art infrastructure that supports sustainable and efficient mining operations, an energy grid that is transitioning to renewable sources, world-class digital connectivity, and a robust land transportation system and specialized ports.

Transportation: Chile has a consolidated transportation network with a national road network of more than 85,000 km of highways and multiple intermodal corridors that facilitate the connectivity of mining sites, located mainly in the north of the country, with key seaports on the Pacific. The ports of Iquique, Antofagasta, Mejillones and Caldera, located between the Tarapacá and Atacama regions, allow a constant flow of copper and other mineral exports, streamlining the international supply chain. Chile's port infrastructure is equipped to handle large volumes, with ore loading and unloading capacity, which is essential to meet the demanding logistical requirements of the mining industry.
(foto de Puerto en el norte)

Images: www.maritimoportuario.cl

Images: la tercera

Energy: Energy generation is fundamental for mining, and in this area, Chile has made significant progress in diversifying its energy matrix with a strong incorporation of renewable energies. Currently, more than 26% of electricity comes from non-conventional renewable sources, especially in mining regions such as Antofagasta and Atacama, where solar and wind power plants abound. In addition, the country has integrated electric transmission systems such as the National Electric System (SEN), which facilitates the availability and stability of the energy needed for high energy demand operations, minimizing interruptions and optimizing costs. The main mineral deposits in Chile are also located in territories where there is a high potential for electricity generation via renewable sources (mainly solar and wind), which facilitates the supply of energy to mining operations with low or zero greenhouse gas emissions.

Images: www.mch.cl

Water and Desalination Infrastructure: Chile has responded to water scarcity by building desalination plants in the north of the country. Currently, there are about 20 plants in operation, including large facilities such as the desalination plant of Compañía Minera Doña Inés de Collahuasi and Minera Escondida's plant, which is one of the largest in the world. These facilities supply water to mining sites in areas where access to fresh water is limited, ensuring a sustainable operation aligned with environmental regulations.

Digital connectivity: Digital connectivity infrastructure complements mining in Chile through fiber networks and the development of 5G, particularly in the north of the country, which facilitates the connection of autonomous equipment and real-time monitoring of mining operations. Remote operations centers in cities such as Santiago and Antofagasta manage sites remotely, improving safety and operational efficiency. Digitalization enables continuous data analysis to optimize predictive maintenance and the use of critical inputs such as energy and water, strengthening the competitiveness and sustainability of Chile's mining sector.

In each of these aspects, Chile offers various investment opportunities and/or strategic alliances that allow integration into any part of the mining production and value chain. This is particularly favored by the portfolio of mining investment projected until 2034, according to the latest report described above (see details here https://www.cochilco.cl/web/inversion/).

And also with the traditional annual FEXMIN fair in Santiago, a mining exploration event organized by the Chilean Association of Geologists. The event, scheduled for August 26-28 this year, brings together professionals and companies specifically focused on mining exploration. For information on how to participate in the 2025 Congress, please visit www.fexmin.cl.

In terms of supply, Chilean mining has a wide range of supply industries, with more than 6,330 companies dedicated to support services, equipment and supplies, contractors, and engineering and consulting services. These companies export both goods and services for all phases of mining activity: exploration, development, extraction, processing and mine closure. Thus, the main exports are grouped into: operating contractors (maintenance), engineering and consulting services (engineering, studies, consulting and projects), equipment and supplies (technical consumables for all areas of activity).

Specifically, the largest movement of exported goods corresponds to grinding media for minerals and ammonium nitrate, while the main exported services are engineering for extractive copper mining facilities, engineering for extractive non-metallic mining facilities, engineering for copper metallurgy facilities, consulting applied to mining, and engineering for electric power generation plants.

Images: pilotaje.cl

However, the sector is highly dependent on foreign suppliers for these types of goods, as the volume of imported equipment and supplies amounts to around US$6.5 billion, far exceeding foreign sales. In this sense, it is important to note that the Chilean mining industry requires motor vehicles for transportation; tires; generators; shovels, excavators, loaders and shovel loaders; fittings and their parts; pumps and fluid elevators and their parts; and centrifuges and apparatus for filtering or purifying gases or liquids and their parts.

Images: www.mch.cl

It is important to consider that, with respect to purchasing processes, the decision-making aspects of mining consumers in Chile differ depending on whether they are dealing with a good or a service. In the case of goods, aspects such as price, delivery time, guarantees and the brand or manufacturer are highly valued. In the case of services, priority is given to the economic support of the supplier, previous experience with the mining company, work methodology, and personnel profile.

In addition, given the large existing supply, the evolution of the commercialization processes of goods and services has led to the emergence of computerized systems for the management and registration of suppliers. Among these systems are the Registry of Suppliers and Contractors (Regic), the Qualification System for Suppliers of Goods and Services (Sicep), and Chile Proveedores. There are also bidding and e-market platforms such as Mercado Público, Q-Market and Codelco's Procurement Portal. Finally, it is important to consider that each mining company has a supplier section on its website.

2 TECHNOLOGY

The Chilean mining sector has embarked on a clear process of automation and remote control of operations, largely driven by Codelco. The state-owned company has a complete fleet of trucks operating autonomously at its Gabriela Mistral Division open pit mine in Calama. In addition, its El Teniente underground mine is remotely controlling some of its LHD equipment and hammer reducers, as well as other services and systems. This concept is also used at the Chuquicamata underground mine.

On the other hand, large private and medium-sized mining companies are incorporating remote control equipment and automation in the remote management of grinding, crushing and ore concentration complexes.

In this sense, due to the growth of autonomous, remote-controlled and data-processing operations, with the incorporation of the Internet of Things (IoT) technology, the Chilean mining industry projects an increase in bandwidth to a range between 8,035 Mbps and 11,897 Mbps by the end of this decade (source: Undersecretary of Telecommunications).

New technologies that support logistics issues offer a threshold of possibilities for digital solutions that help reduce costs and increase the efficiency of operations, in addition to reducing environmental impact and improving the safety of processes.

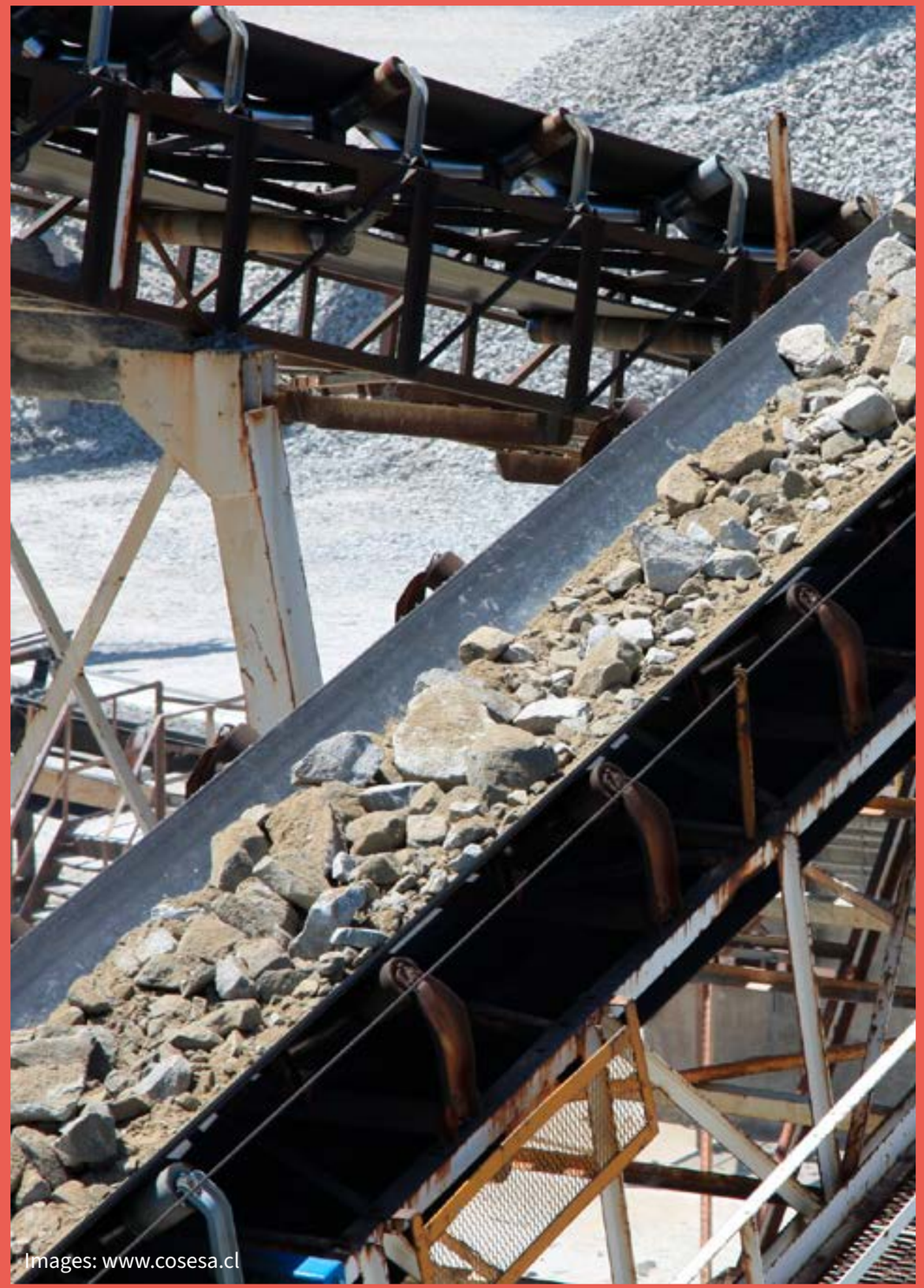
As in other complex industries, the trend in large mining companies is to centralize the logistics management of incoming flows (raw materials, spare parts, components, machinery, etc.) and to place great emphasis on the continuity of the logistics chain of commercial products. In addition to adapting to new logistics models, the mining industry has adopted technology and new solutions, such as the use of Radio Frequency Identification (RFID) technology for inventorying and locating materials, traceability systems, the use of rotainers to transport concentrates to ports, and special containers to transport concentrates on ships. In this sense, the projected growth in concentrate production through 2033 will require continued expansion and modernization of port infrastructure for the sector.

Images: www.mch.cl

INFO BOX
COOPERATION POTENTIAL IN THE AREA OF EFFICIENCY AND PROCESS OPTIMIZATION THROUGH STATE-OF-THE-ART TECHNOLOGIES.

According to conversations that AHK Chile has had with the mining industry, one of the great challenges of the national industry is the need to reach the total operational production goals. Therefore, cutting-edge technology that can help to considerably increase efficiency and therefore achieve operational goals is highly valued.

On the other hand, Germany has the challenge of diversifying its supply with strategic and critical minerals and can provide such technology in several areas. This is where a field of cooperation with new models of strategic alliances becomes evident, where Germany could move out of its traditional role as a simple technological “Supplier” and where the mining industry could, through new business models access to high technologies that sometimes have been declared ‘high end’ or ‘expensive in comparison to others’. With an alliance model that offers technology (including the financing of that technology) in exchange for securing raw material purchase rights, a typical win-win situation could be established, solving major challenges for both countries.



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3 PROCESS OPTIMIZATION AND ENVIRONMENTAL MANAGEMENT

The aging of the deposits in Chile results in lower grade ores that are more complex to treat. In general, the richest ores have already been discovered and are in operation. This has forced the industry to seek improvements in the efficiency of ore extraction and processing (concentration). Research into innovative alternatives focuses on several key aspects of the process, from the pre-sorting and pre-concentration stages of the ores to improve energy efficiency, to water consumption and materials management to improve productivity, especially steel consumption in protective liners and milling equipment.

Also review info box on potential for Cooperation in the field of Efficiency and Optimization.

The objective is to reduce the environmental impact by facilitating waste management. In this sense, one of the latent challenges in Chilean copper mining is to improve the flotation process for fine and coarse materials, where low levels of efficiency are observed. Given that new mining projects in Chile involve flotation processes, interesting opportunities arise for the development of systems and products that help to improve the efficiency of this key stage of mining production.

On the other hand, the environmental remediation needs in Chilean mining are mainly focused on the management of the dams or reservoirs where the tailings from the ore concentration process are placed. There are 795 tailings impoundments in Chile, of which 15 are under construction, according to Sernageomin (2023).
In the case of active deposits, the current legislation on the closure of mining operations establishes specific responsibilities and requirements for this process. In the case of abandoned deposits, the plan is to promote public-private agreements for their relocation and closure, for which the government launched in January 2025 a strategic agenda with three lines of work and seven concrete actions that aim to update current regulations and raise international standards, through initiatives such as reprocessing and reuse programs or the creation of digital platforms that allow monitoring the issue, integrating innovation and technology.

One of them is a program that allows new projects to offset their environmental impact by relocating or closing these deposits. On the other hand, the plan also promotes the reprocessing of tailings to recover elements of economic value or their reuse as raw materials in other industries, including possible tax incentives for this. This opens up new opportunities for companies dedicated to environmental management and remediation services and the circular economy.

Images: www.cochilco.cl

Images: jocienemelo

TERMINOLOGY

BEV	Battery Electric Vehicle
Capex	Capital Expenditures
CMF	Financial Markets Commission
CBC	Capital Goods Corporation
Cochilco	Chilean Copper Commission
Corfo	Chilean Economic Development Agency
DL	Decree Law
DRC	Democratic Republic of Congo
DS	Supreme Decree
ECLAC	Economic Commission for Latin America and the Caribbean
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
ESG	Environmental, Social & Governance
EU	European Union
FMT	Fine metric tones
FURE	Smelting and refining
ILO	International Labor Organization
IVA (VAT)	Consumer Price Index
ENAMI	National Mining Company
PHEV	Plug-in hybrid electric vehicle
MoU	Memorandum of Understanding
MT	Metric tons
RCA	Environmental Qualification Resolution
R&D	Research and Development
R&D&I	Research, Development and Innovation
SEIA	Environmental Impact Assessment System
Sernageomin	National Geology and Mining Service
USD	US dollar
USGS	United States Geological Survey
UTM	Monthly Tax Unit

STATE OF THE COPPER INDUSTRY

CHILE 2024/2025

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