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# Energy Potential & Consumption of the mining sector in Latin America and th Caribbean

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**Latin American and the Caribbean Energy Organization (OLACDE)**

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This technical note is the result of a collaborative effort by the OLACDE technical team.

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# GLOSSARY

| | |
|---|---|
| **LAC** | Latin America and the Caribbean |
| **Au** | Chemical symbol for gold |
| **Ag** | Chemical symbol for silver |
| **BM** | World Bank |
| **CAF** | Development Bank of Latin America |
| **ECLAC** | Economic Commission for Latin America and the Caribbean |
| **$CO_2$** | Carbon Dioxide |
| **Cu** | Chemical symbol for copper |
| **REE** | Rare Earth Elements |
| **GWh** | GigaWatts-hours |
| **AI** | Artificial Intelligence |
| **IEA** | International Energy Agency |
| **Li** | Chemical symbol for lithium |
| **MAD** | Data Adaptability Model |
| **ONEI** | National Office of Statistics and Information |
| **OLACDE** | Latin American and Caribbean Energy Organization |
| **RIGI** | Incentive Regime for Large Investments |
| **SEGEMAR** | Argentine Geological Mining Service |
| **SEN** | National Electric System |
| **SERGEOMIN** | Bolivian Geological Mining Service |
| **UPME** | Mining and Energy Planning Unit |
| **USGS** | United States Geological Survey |
| **Zn** | Chemical symbol for zinc |

# TABLES

# EXECUTIVE SUMMARY

The global energy transition has placed Latin America and the Caribbean (LAC) in a position of unprecedented strategic centrality. However, this geological relevance occurs at a critical juncture: while the region holds the mineral reserves essential for the planet's decarbonization, its own power systems face growing pressure to support the infrastructure that enables such extraction. In a scenario where global demand for critical minerals such as lithium and copper could multiply by the year 2040 (IEA, 2025), mining has ceased to be an isolated sectoral activity and has transformed into a structural pillar of regional energy security, **currently representing 9% of total electricity consumption in LAC.**

Various studies have underscored that the availability of critical minerals is the determining factor for meeting global climate commitments. However, the region still displays heterogeneous levels of development and a fragmentation in geoscientific knowledge that prevents the consolidation of a long-term regional strategy. With the exception of established mining hubs like Chile and Peru, which have demonstrated the value of integrating mining into infrastructure planning, many countries still face institutional and regulatory barriers that have delayed the valorization of their geological potential, subordinating it to political and social uncertainties.

This document analyzes the causes of this lack of coordination and strategies for addressing it through an integrated energy policy approach. In this context, it proposes an analytical integration that links the geological availability of critical minerals with resource governance and the planning of optimal power system expansion. This approach allows for the identification of how the maturation of mining projects impacts the stability and reliability of the regional energy matrix. The analysis utilizes the Data Adaptability Model (MAD)[1] as an analytical framework to investigate the convergence of transition challenges with the specificities of regional industrial demand.

From a quantitative perspective, the study projects regional energy requirements toward the 2034 horizon, a cycle that allows for the observation of mining asset maturation in line with long-term power infrastructure planning. The results show a structural expansion of industrial load, with a cumulative regional growth of 62%, which would raise the mining sector's consolidated consumption to 201.6 TWh. Nevertheless, the analysis reveals that mining expansion scenarios lacking coordination with transmission infrastructure imply higher risks of operational

[1] Analytical framework developed to process heterogeneous technical information from multiple national sources. The model allows for the normalization and projection of electricity consumption trends using adjustment algorithms that consider the specificities of industrial demand and network expansion plans in contexts of data uncertainty.

restrictions and redundant investment costs. This finding is consistent with literature on planning under uncertainty, which warns of the additional costs associated with a lack of synchronization between generation nodes and electro-intensive load centers located in mountainous or isolated areas.

Furthermore, there is a significant asymmetry in national risk and opportunity profiles by 2034. The "losses from inaction", understood as the cost of maintaining rigid power infrastructure in the face of growing mining demand, are concentrated in countries with disruptive leaps in their projections, such as Argentina and Peru. In these cases, the magnitude of megaprojects, especially for copper, requires a level of firm power capacity that exceeds current reserve capabilities. In contrast, countries like Guyana demonstrate how the transition from self-generation schemes to integrated networks under gas-to-energy projects can mitigate system vulnerability. This tension between geological potential and electricity sufficiency underscores the urgency of establishing cooperative mechanisms and stable investment frameworks that equitably distribute the benefits of industrial activity.

From a qualitative standpoint, the results indicate that LAC is experiencing a historic window of opportunity. The convergence of an urgent climate crisis, the maturity of technical solutions in renewable energy for mining, and a political will reinforced by the need for economic resilience, creates the ideal context to advance in regional mining-energy integration. This juncture offers the necessary impetus to overcome the regulatory and geopolitical barriers that have fragmented the value chain until now, but its nature is ephemeral. Only as long as the pressure to secure supplies for the energy transition persists will there be sufficient incentives to transform urgency into concrete planning decisions.

Seizing this opportunity requires political leadership, immediate regional coordination, and the formalization of a strategic agenda that articulates mining potential with power infrastructure. Acting now will allow the region to convert its natural capital into tangible progress, strengthening LAC's energy sovereignty and positioning OLACDE member countries as global references for technically integrated and socially responsible decarbonization.

# 1. INTRODUCTION

## 1.1. General context

The global energy transition is driving a profound transformation of energy systems, characterized by the accelerated expansion of renewable energy, the electrification of transport, and the deployment of energy storage systems. This process entails a significant increase in the demand for critical minerals. According to International Energy Agency estimates, global lithium demand could increase sixfold by 2040, while copper demand would increase by 50% in the same period, driven mainly by the expansion of power grids, renewable energy, and electric vehicles (IEA, 2025). Other minerals such as nickel, graphite, and rare earth elements would register increases of between two and four times current levels.

In this scenario, the availability of and secure access to critical minerals have become a central component of energy security. Various studies show that clean energy technologies are significantly more mineral-intensive than conventional technologies: an electric vehicle requires, on average, six times more mineral inputs than an internal combustion engine vehicle, while an onshore wind plant demands approximately nine times more minerals per unit of installed capacity than a gas-fired power plant. This increasing mineral intensity reinforces the strategic relevance of regions with abundant geological resources (World Bank, 2020).

Among these minerals, copper, lithium, nickel, graphite, manganese, and rare earth elements stand out, among others, playing an essential role as inputs for key energy transition technologies, such as batteries, electric vehicles, wind turbines, photovoltaic panels, and power transmission grids. Various international organizations have pointed out that the availability, secure access, and sustainability of the production of these minerals have become a critical factor in ensuring energy security and compliance with global climate commitments.

This strategic dependence on mineral resources carries an intrinsic pressure on the global power infrastructure. In a context where consumption projections for data centers and Artificial Intelligence (AI) capture global attention with an estimated increase of 10%, it is imperative not to overlook the magnitude of the energy demand required by mining development. The latter constitutes the true physical foundation of the energy transition. In LAC, the mining sector already represents 9% of regional electricity consumption, consolidating itself as a structural pillar of energy planning that guarantees the necessary inputs for global decarbonization.

In this scenario, the region occupies a strategic position worldwide. The sector concentrates a significant proportion of the world's copper and lithium reserves, among others mentioned above, while also possessing geological potential that has

not yet been fully explored for other critical minerals. This endowment of natural resources places the member countries of the Latin American and Caribbean Energy Organization (OLACDE) in a key position within global supply chains linked to the energy transition.

However, the region's mining potential does not automatically translate into economic, industrial, or energy development (IEA, 2025). The strategic valorization of these resources depends on multiple factors, including the degree of geological knowledge, the availability of reliable information, regulatory frameworks, social acceptance of mining activity, energy and logistics infrastructure, and the capacity of countries to articulate public policies that integrate mining, energy, and productive development.

## 1.2. Rationale of the document

In recent years, an abundance of studies, technical reports, documents from multilateral organizations, and publications from national geological services have been produced, analyzing the mining potential of LAC from different perspectives.

From the perspective of OLACDE, it is relevant to have a technical document that systematizes and synthesizes the existing knowledge on the region's mining potential, placing special emphasis on those minerals directly linked to the energy transition. This approach strengthens the strategic analysis of the challenges and opportunities facing the region in a scenario of increasing global competition for critical minerals.

This technical note is, therefore, conceived as an exercise in integrating and analyzing existing information, without intending to replace specialized studies or country-specific assessments, but rather to offer a regional, comparative vision oriented toward decision-making regarding energy and sustainable development. Furthermore, it includes the energy projections demanded by mining, to support comprehensive sector planning with information.

## 1.3. Objectives

### General Objective

To analyze and synthesize the mining potential of LAC, focusing on minerals critical to the energy transition, based on technical and statistical information from official and international sources, with the aim of providing relevant input for the formulation of energy and regional development policies.

### Specific Objectives

- Identify the main geological and metallogenic characteristics that explain the region's mining potential.

- Analyze the current situation and future potential of the main minerals critical to the energy transition in LAC.
- Present a comparative overview of the mining potential in selected countries of the region, members of OLACDE.
- Identify gaps, challenges, and opportunities at the regional level regarding geological information, governance, and coordination with the energy sector.
- Determine the potential electricity demand linked to the region's mining development.
- Explore the implications of mining development for energy planning and regional integration.

## 1.4. Scope and limitations

The geographical scope of this document includes the 27 member countries of OLACDE, with a more detailed analysis of those countries that present the greatest potential in the production of critical minerals, such as Chile, Argentina, Peru, Bolivia, Brazil, Colombia, Ecuador, Panama, and Jamaica.

From a thematic point of view, the analysis focuses on minerals with direct or indirect applications in energy systems, including, among others, copper, lithium, rare earth elements, graphite, nickel, and manganese. Traditional minerals for non-energy use are not addressed in depth, except when they are relevant for contextualizing regional mining activity.

This technical note synthesizes available information published by partner organizations such as the International Energy Agency (IEA), the Economic Commission for Latin America and the Caribbean (ECLAC), the CAF – Development Bank of Latin America, the World Bank, and the competent geological services and ministries of the countries in the region.

## 1.5. Methodology

The preparation of the document is based on a systematic review of technical and statistical literature, including international reports, publications from multilateral organizations, official documents from national governments, and technical materials prepared by geological services.

The information collected was organized and analyzed with a regional approach, prioritizing comparability between countries and the identification of common patterns. Likewise, a cross-sectional perspective from the energy standpoint was incorporated, in line with OLACDE's institutional mandate, highlighting the links between mining, energy security, energy transition, and sustainable development.

## 1.6. Structure of the document

The document is organized into six chapters. Following this introduction, Chapter 2 analyzes the main minerals critical to the energy transition, evaluating their current status and potential in the region. Chapter 3 provides a country overview for a selected set of OLACDE members. Chapter 4 identifies gaps, challenges, and opportunities at the regional level and the implications of mining potential for regional energy policy. Chapter 5 analyzes the energy requirements of the mining sector, detailing the projection methodology to present the current consumption situation and national demand projections toward 2034. Finally, Chapter 6 presents the study's main conclusions and recommendations.

# 2. CRITICAL MINERALS FOR THE TRANSITION

## 2.1. Scenario

The transition toward more sustainable, decarbonized, and resilient energy systems has substantially increased the demand for a specific set of minerals and metals, commonly referred to as critical minerals. These inputs are fundamental for the manufacturing of key technologies such as electric vehicle batteries, energy storage systems, wind turbines, solar panels, power grids, and electronic equipment associated with the digitalization of the energy system.

Various international organizations have warned that the growth rate of demand for these minerals could exceed existing supply capacity, creating risks for energy security and the fulfillment of climate objectives. In this scenario, LAC positions itself as a strategic region, both due to its resource endowment and its potential, which has not yet been fully developed.

This chapter analyzes the region's role in relation to the main critical minerals for the energy transition, evaluating their current status, future potential, and the main challenges associated with their development.

## 2.2. Copper

Copper is one of the most relevant minerals for the energy transition due to its high electrical and thermal conductivity. It is an essential input for renewable energy generation, transmission and distribution grids, electromobility, and energy storage; therefore, the electrification of the economy implies a significant increase in copper use intensity.

Latin America concentrates a significant proportion of global copper reserves and production, with Chile and Peru standing out as the leading producers globally. Other countries such as Mexico, Brazil, Argentina, and Colombia also possess relevant resources, albeit at different levels of development.

Most of the region's large copper deposits are located in the Andean belt, associated with porphyry-type deposits characterized by large volumes and relatively low grades, but with favorable economies of scale.

Outside this environment, Brazil’s potential stands out, with production mostly concentrated in the Carajás Mineral Province, which hosts the largest amount of contained copper in the country. Unlike the Andean porphyries, many of these deposits are of the IOCG (Iron Oxide-Copper-Gold) type, characterized by a high abundance of iron oxides (primarily hematite) associated with economically significant concentrations of copper and gold. Additionally, copper mineralization in

Brazil also occurs in VMS, porphyry, sedimentary exhalative (SEDEX), and sediment-hosted deposits in other regions of the country.

Despite this geological wealth, the regional industry faces critical challenges, such as the gradual decline in ore grades, rising operating costs, water management, and the complexity of socio-environmental conflicts. Nevertheless, the magnitude of existing resources and the remaining exploratory potential position the region as a key player for global copper supply in the coming decades.

## 2.3. Lithium

Lithium is a central component of the rechargeable batteries used in electric vehicles and energy storage systems. Its demand has grown exponentially in recent years and is expected to continue increasing in line with decarbonization and transport electrification goals.

LAC is home to one of the world's primary lithium reservoirs, concentrated in the salt flats (*salares*) of the Altiplano and Puna regions of Argentina, Bolivia, and Chile, known as the "Lithium Triangle." These brine systems represent a competitive advantage over other types of deposits due to their relatively low extraction costs, although they present specific environmental and social challenges linked to water use.

While Chile and Argentina have active production operations and advanced projects, Bolivia possesses some of the largest known resources, though with more incipient development. At the same time, lithium exploration in Brazil is expanding rapidly, particularly in the Jequitinhonha Valley (Minas Gerais). Unlike brine-based resources, this area is establishing itself as a hard-rock lithium district in the Southeast region, hosting high-quality spodumene deposits and benefiting from well-developed infrastructure, positioning the country as a relevant player in the global supply chain.

Altogether, the advancement of new direct extraction technologies and the growing interest from international actors open opportunities to accelerate lithium utilization in the region, provided that regulatory and socio-environmental aspects are adequately addressed.

## 2.4. Nickel and Manganese

Nickel and manganese are key components of various lithium-ion battery chemistries, particularly those aimed at increasing energy density and the range of electric vehicles. Additionally, manganese plays a relevant role in the steel industry and in energy applications.

In Latin America and the Caribbean, the main nickel resources are located in countries such as Brazil, Colombia, Cuba, and the Dominican Republic, generally

associated with lateritic and sulfide deposits. Manganese has a broader distribution, with significant resources in Brazil and other countries in the region.

Although the region does not lead global production of these minerals, the existing potential and the diversification of global demand open opportunities to strengthen its participation in supply chains.

## 2.5. Graphite

Graphite is an essential component of lithium-ion battery anodes. Despite its lower visibility compared to other critical minerals, its strategic importance has increased in the context of electromobility and stationary energy storage.

Brazil stands out as the region's leading graphite producer and one of the relevant players worldwide. Other countries present geological potential for natural graphite, although in many cases they are in the early stages of exploration. The development of this value chain could represent an opportunity to diversify the regional mining base and reduce dependence on external suppliers.

## 2.6. Rare Earth Elements (REE)

Rare earths comprise a group of elements essential for the manufacture of permanent magnets used in wind turbines, electric motors, and various electronic applications. Their global supply is highly concentrated, particularly in the processing and refining stages, which has raised concerns regarding supply security.

In LAC, much of the rare earth potential is still in an exploratory phase. Brazil shows the most significant progress, standing out as the country with the second-largest rare earth reserves globally, after China, and as an emerging producer of REE in the region. Recent developments in Brazil include the start of industrial-scale production associated with ion-adsorption clay deposits, reinforcing the region’s relevance for the diversification of rare earth supply chains outside Asia. Other countries may host resources that have not yet been evaluated, suggesting the need to strengthen geological exploration and applied research.

## 2.7. Comparative Assessment of Regional Potential

Taken as a whole, the critical minerals analyzed demonstrate that LAC possesses a combination of consolidated resources (such as copper and lithium) and emerging potentials (such as graphite and rare earths). This diversity positions the region as a relevant actor not only in the extractive stage but also as a potential articulator of value chains linked to the energy transition.

However, the development of this potential faces common challenges, including the need for sustained investment in exploration, stable regulatory frameworks, social

acceptance of mining activity, and greater integration between mining and energy policies.

The analysis of the main critical minerals for the energy transition confirms that LAC has a strategic resource base of global relevance. The region has the opportunity to consolidate its role as a reliable provider of essential minerals, contributing simultaneously to its own energy and sustainable development goals.

Materializing this potential will require comprehensive approaches that link geology, mining, energy, environment, and productive development, as well as greater regional cooperation. These aspects will be addressed in the following chapters, with special emphasis on country-specific analysis and the implications for regional energy policy.

# 3. NATIONAL MINING OVERVIEWS

## 3.1. Mining Heterogeneity

Although LAC shares common geological characteristics that explain its high mining potential, the distribution of resources, the degree of geological knowledge, and the level of development within the mining sector vary significantly across countries. These differences stem from geological, historical, institutional, regulatory, and socioeconomic factors.

This chapter presents a synthetic overview of the mining potential in a selection of the region's countries, members of OLACDE, which are particularly relevant due to their endowment of minerals critical to the energy transition. The analysis focuses on identifying predominant strategic minerals, the sector's state of development, and its regional relevance.

Due to this heterogeneity, the countries analyzed in this chapter are presented following a combined criterion of strategic relevance for the energy transition and the degree of mining sector development. This criterion considers, among other aspects, the presence of critical minerals, production levels, and the institutional and technical maturity associated with mining activity. The order of presentation serves analytical and comparative purposes and does not imply a hierarchy or ranking among countries.

## 3.2. Chile

Chile is positioned as one of the countries with the greatest mining relevance globally, especially regarding copper. The country accounts for 22% of global reserves and 25% of global production of this metal (Mining Council, 2025).

In addition to copper, Chile possesses significant lithium resources in the salt flats of the northern part of the country, particularly in the Salar de Atacama, one of the most productive brine systems worldwide. The Chilean mining sector is characterized by a high level of geological knowledge, a consolidated institutional framework, and a strong link with energy infrastructure.

| *Mineral* | *Production (tons)* | *World Production* | *World Share %* | *Reserves (tons)* | *World Reserves (tons)* | *World Share (%)* |
|---|---|---|---|---|---|---|
| *Copper* | 5.372.694 | 22.000.000 | 25 % | 190.000.000 | 880.000.000 | 22 % |
| *Lithium* | 49.000 | 240.000 | 20 % | 9.300.000 | 28.000.000 | 33 % |
| *Silver* | 1.200 | 25.000 | 5 % | 26.000 | 641.400 | 4 % |
| *Molybdenum* | 38.970 | 380.000 | 10 % | 1.400.000 | 15.500.000 | 9 % |

*Table 1 – Mineral Production (2024) and Reserves in Chile*

*(Self-elaboration based on USGS)*

## 3.3. Peru

Peru is one of the world's leading producers of copper and a relevant player in the production of zinc, silver, and gold. Mining constitutes a central pillar of the Peruvian economy and is supported by an extensive Andean metallogenic belt with numerous world-class deposits.

In the context of the energy transition, copper acquires strategic importance for the country. Peru has a high level of geological knowledge and a significant portfolio of projects in various stages of development, although it faces challenges associated with social conflict and permit processing.

| *Mineral* | *Production (tons)* | *World Production* | *World Share %* | *Reserves (tons)* | *World Reserves (tons)* | *World Share (%)* |
|---|---|---|---|---|---|---|
| *Copper* | 2.760.000 | 22.000.000 | 13 % | 110.000.000 | 880.000.000 | 13 % |
| *Silver* | 3.100 | 25.000 | 12 % | 93.000 | 641.400 | 15 % |
| *Zinc* | 1.470.000 | 13.000.000 | 11 % | 20.000.000 | 250.000.000 | 8 % |
| *Molybdenum* | 32.000 | 380.000 | 8 % | 2.800.000 | 15.500.000 | 18 % |
| *Lead* | 310.000 | 4.600.000 | 7 % | 6.500.000 | 95.000.000 | 7 % |
| *Gold* | 90 | 3.300 | 3 % | 2.100 | 57.000 | 4 % |
| *Tin* | 26.000 | 310.000 | 8.4% | 110.000 | 4.900.000 | 2 % |

*Table 2 – Mineral Production (2024) and Reserves in Peru*

*(Self-elaboration based on USGS)*

Peru constitutes one of the mining pillars of our region, with a particularly significant presence in the global markets for copper, silver, zinc, and molybdenum. According to USGS data, Peru contributes approximately 13% of world copper production, positioning itself as the second-largest global producer (behind Chile) and concentrates a similar proportion of world reserves of this mineral, which is fundamental for the expansion of power grids, renewable energy, and electromobility.

In the case of silver, Peru maintains an equally prominent role, with more than 12% of world production and nearly 15% of global reserves, positioning it as one of the leading international suppliers. Likewise, the country exhibits relevant participation in the production of zinc and lead, essential minerals for industrial applications and technologies associated with the energy transition.

Molybdenum, mostly produced as a by-product of copper mining, reinforces the strategic importance of the Peruvian mining sector, with a share of over 8% of global production and a particularly high proportion of reserves. Finally, although with less

relative weight, Peru maintains a presence in markets such as gold and tin, consolidating a diversified mining base.

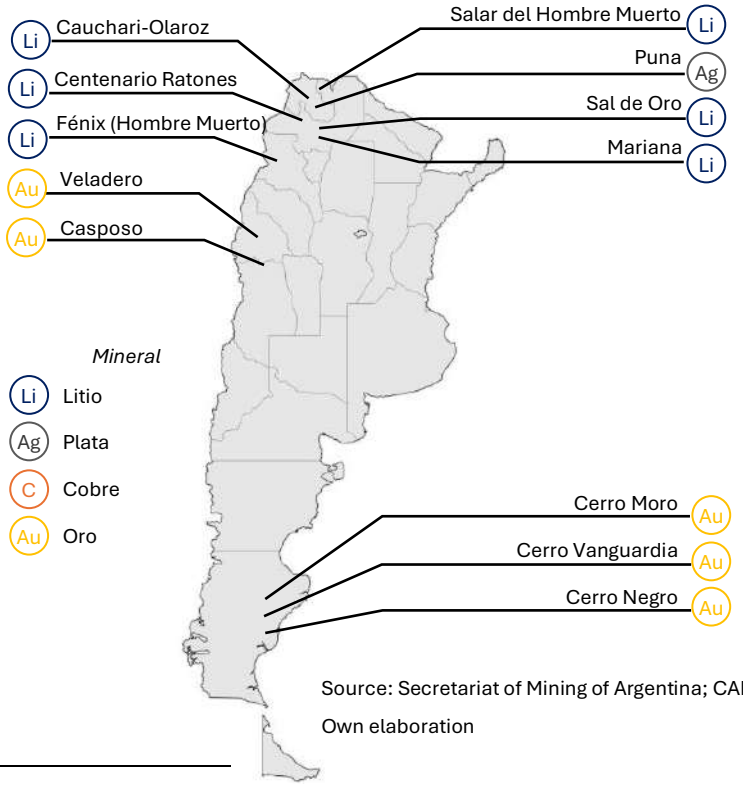
Taken together, these indicators demonstrate that Peru is not only a relevant producer on a regional scale but also a structural actor in the global supply of critical and strategic minerals, with direct implications for energy security and the energy transition at an international level.

## 3.4. Argentina

Argentina presents a vast and diverse mining potential, with a growing prominence of lithium in recent years, which is found in the salt flats (salares) of the country's northwest, shared with Bolivia and Chile.

The Argentine Geological and Mining Survey (SEGEMAR)[2] is the institution dedicated to the research and development of geological and mining studies in Argentina, whose mission is to provide reliable and updated information, thus contributing to the country's sustainable development.

In recent years, the country has experienced significant growth in the exploration and development of lithium projects, positioning itself as one of the main emerging players globally.




Source: Secretariat of Mining of Argentina; CAEM

Own elaboration

[2] SEGEMAR has an official website (https://www.segemar.gov.ar) where relevant resources and data can be accessed.

*Main mining projects in operation*

Likewise, Argentina possesses relevant resources of copper, gold, and silver, primarily in the Andean region, many of which are in various stages of exploration and feasibility. Strengthening infrastructure and regulatory frameworks is key to materializing this potential.

In 2024, mining exports in Argentina exceeded USD 4.5 billion, representing nearly 6% of the country's total exports, with gold as the main product, accounting for 60% of total external sales, even though in recent years, lithium has significantly modified the composition of the mining basket.

Currently, Argentina has 26 mining projects in operation, the most relevant of which are presented in Figure 2. However, most initiatives in the construction, feasibility, and pre-feasibility stages correspond to lithium and copper, key minerals for the global energy transition.

Argentina already has seven projects in operation, using both direct extraction and evaporation methods. However, regarding copper, industrial-scale production is not yet recorded, despite having some of the most advanced projects in the region.

The RIGI (Incentive Regime for Large Investments) is an Argentine law (Law 27.742) that seeks to attract million-dollar investments to key sectors such as energy, mining, technology, and infrastructure, offering fiscal and exchange stability for 30 years, tax benefits (reduction in Income Tax, exemption from import tariffs), and legal certainty for large strategic projects, facilitating the import of goods and the repatriation of foreign currency to generate employment and development.

## 3.5. Brazil

Brazil stands out for the diversity and magnitude of its mining base, as well as for the high degree of institutional and technical development of its extractive sector. The country is one of the world's leading iron producers and possesses a significant endowment of strategic minerals for the energy transition, including nickel, manganese, graphite, copper, lithium, and rare earth elements. This combination of production scale, mineral diversity, and operational continuity positions Brazil as one of the most consolidated mining players in Latin America.

Table 3 provides an overview of mineral production and reserves in Brazil, highlighting key minerals essential for the energy transition.

| *Mineral* | *Production (tons)* | *World Production* | *World Share %* | *Reserves (tons)* | *World Reserves (tons)* | *World Share (%)* |
|---|---|---|---|---|---|---|

| | | | | | | |
|---|---|---|---|---|---|---|
| *REEs (light)* | 2.000 | 390.000 | 0,5 % | 21.000.000 | 85.000.000 | 25 % |
| *Copper** | 384.000 | 23.000.000 | 1,6 % | 79.000.000 | 980.000.000 | 8 % |
| *Lithium* | 12.000 | 290.000 | 3 % | 540.000 | 37.000.000 | 1 % |
| *Graphite* | 65.000 | 1.800.000 | 3,6 % | 74.000.000 | 310.000.000 | 24 % |
| *Nickel* | 70.000 | 3.900.000 | 1,7 % | 16.000.000 | 140.000.000 | 11 % |
| *Niobium* | 104.000 | 112.000 | 92,8 % | 14.000.000 | 21.000.000 | 67 % |
| *Manganese* | 800.000 | 20.000.000 | 4% | 300.000.000 | 1.800.000.000 | 17% |
| *Tin* | 28.000 | 290.000 | 9,6% | 700.000 | 6.000.000 | 12 % |

*Table 3 – Mineral Production (2025 and *2024) and Reserves in Brazil*[3]

In the lithium market, the country stands out for recent developments in the 'Jequitinhonha Valley', Minas Gerais, ranking 6th globally in both production and reserves. Regarding rare earth elements (REEs), Brazil holds the world's 2nd largest reserves (24.7% of the global total), with cutting-edge projects in ion-adsorption clays, such as Serra Verde/Pela Ema (Goiás), which offer competitive advantages in terms of costs and energy efficiency.[4]

The Brazilian geological potential is mainly associated with ancient shields and cratons, particularly the Brazilian Shield and the Carajás Mineral Province, where significant mafic-ultramafic and lateritic deposits are concentrated. These geological environments host relevant resources of copper, nickel and cobalt, minerals key to energy storage technologies, electromobility, and electrification. Recent technical studies by the Geological Survey of Brazil (SGB, 2023) highlight the existence of lateritic resources with cobalt content associated with nickel deposits, as well as interest in evaluating processing routes that allow for improved utilization of these strategic metals.

According to official information from the National Mining Agency (ANM, 2024), metallic mining and graphite production account for most of the value of the country's mineral production, including substances considered priority in the context of the energy transition, such as aluminum, copper, graphite, manganese, nickel, and zinc. This production base is supported by large mining complexes, developed infrastructure, and a structurally surplus mining trade balance, which reinforces Brazil's role as a relevant supplier of metallic minerals regionally and internationally.

Brazil also has solid mining institutions, integrated by specialized technical agencies, applied research capabilities, and an active agenda of geological studies oriented toward strategic minerals. However, the sector's export profile continues to be

[3] Self-elaboration based on USGS Mineral Commodities Summaries 2026 and *Geological Survey of Brazil, 2026 - An overview of critical and strategic minerals potential of Brazil: 2026 edition.
[4] (Ministério de Minas e Energia [MME], 2026)

dominated by primary or low-processed products, which evidences opportunities to move toward greater value addition and deeper insertion into supply chains linked to the energy transition.

## 3.6. Mexico

Mexico has one of the most consolidated mining industries in Latin America, with a long production tradition, a developed institutional base, and high mineral diversification. The mining-metallurgical sector maintains a relevant participation in the national economy and industrial GDP, supplies a wide range of production chains, and, according to the Mexican Geological Service (SGM, 2024), generates more than 400,000 direct jobs.

From a strategic perspective, Mexico occupies a prominent global position in the production of various minerals. It is the leading global producer of silver and is among the top producers of copper, zinc, lead, and molybdenum, minerals key to electrification, energy infrastructure, and technological transition. This combination of scale, diversity, and production continuity reinforces its relevance as a reliable supplier of strategic minerals.

However, in recent years, the sector has faced a more challenging context, marked by a slowdown in activity, lower investment in exploration, and a regulatory environment perceived as less stable. These factors introduce uncertainties regarding the future evolution of mining in the country and its ability to expand its contribution to value chains linked to the energy transition.

## 3.7. Bolivia

Bolivia possesses one of the world's largest known lithium resources, concentrated mainly in the Salar de Uyuni, which gives it strategic relevance in the context of the global battery and energy storage market. However, the development of these resources has been slower compared to other countries in the "Lithium Triangle," due to technological, institutional, and infrastructure challenges.

In addition to lithium, the country has a long mining tradition associated with the exploitation of tin, silver, and zinc, which has historically been a relevant component of its extractive economy.

In recent years, Bolivia has begun to explore its potential in technological minerals linked to the energy transition, particularly in rare earth elements (REE). In this framework, the Geological Mining Service of Bolivia (SERGEOMIN), through the Technical Directorate of Prospecting and Exploration, developed specific studies during 2024 in the Serranía Palca, located in the Alcalina province of Ayopaya (Cochabamba department), where significant concentrations of light rare earth elements were identified.

Overall, these findings confirm that Bolivia combines a high endowment of strategic resources with a still incipient level of development in several of them, which reinforces the need to deepen exploration work and strengthen technical and institutional capacities for their eventual insertion into the energy transition value chains.

## 3.8. Colombia

Colombia presents a diverse mining potential, with resources of nickel, copper, gold, and coal. Currently, its ferronickel production is an important input for the manufacture of stainless steel and high-strength alloys, useful for renewable energy generation infrastructure.

While the country has significant resources, the development of the mining sector faces challenges linked to social conflict, informality, and limitations in infrastructure and geological knowledge in some regions.

## 3.9. Ecuador

Ecuador is emerging as a country with expanding mining potential, particularly in copper and gold, associated with the Andean belt. In recent years, the development of medium- and large-scale projects has allowed the country to position itself as a new player in the region's metallic mining.

In the context of the global energy transition, copper acquires particular strategic relevance for Ecuador, given its key role in electrification, the expansion of renewable energy, and the development of electrical infrastructure. The portfolio of projects in various stages of development evidences a significant resource base, with deposits of sufficient scale to be inserted into critical mineral supply chains.

The strengthening of geological services and mining institutions has been a determining factor in the identification and valuation of these resources. However, large-scale mining development poses additional challenges, including the need for adequate energy planning, as well as issues linked to social acceptance and regulatory stability. In this sense, recent experience in the country highlights the importance of articulating mining and energy policies early on, in order to ensure the energy supply required by the projects, minimize risks to the power system, and support the sector's development under sustainability criteria.

## 3.10. Panama

Panama holds relevant copper resources, associated with large, low-grade deposits. Metallic mining has gained visibility in recent years, although its development has been subject to institutional and social debates.

From a regional perspective, Panama's copper potential represents an opportunity, provided that regulatory, environmental, and governance aspects are adequately addressed. The country's main copper project, Cobre Panamá, ceased commercial operations at the end of 2023 following the Supreme Court of Justice's ruling of unconstitutionality regarding the mining concession contract. Since then, the project has been in a Preservation and Safe Management phase, oriented exclusively to the maintenance of facilities and the mitigation of environmental risks, without extraction or mineral processing activities.

Panama possesses relevant copper resources, associated with large-scale, low-grade deposits, whose potential has been identified as significant from a regional perspective. The presence of these deposits positions the country as a case of interest in geological terms within Central America. However, the development of metallic mining in Panama has been strongly conditioned by institutional, regulatory, and social factors. In recent years, the sector has faced high regulatory uncertainty and intense public controversy, which has limited the continuity of projects and the availability of systematized technical information.

From a regional perspective, the Panamanian case illustrates how the existence of relevant geological resources does not guarantee their effective utilization in the absence of stable institutional frameworks, clear governance mechanisms, and social acceptance. In this sense, Panama represents an example of conditioned mining potential, whose future development will depend on the evolution of the regulatory environment and the capacity to articulate public policies that integrate mining, environment, and sustainable development.

## 3.11. Dominican Republic

The Dominican Republic possesses relevant mining potential in the Caribbean context, particularly associated with nickel, gold, and silver. The country is one of the region's main producers of lateritic nickel.

The Falcondo nickel deposit constitutes one of the most important mining assets in the country and has historically sustained national production. Likewise, gold mining has gained relevance in recent years, consolidating the mining sector as a significant component of the Dominican economy. From a regional perspective, the Dominican Republic stands out for its experience in the exploitation of lateritic minerals and for its insertion into nickel supply chains, although it faces challenges linked to environmental management, social acceptance, and the diversification of its mining base.

| *Mineral* | *Production (tons)* | *World Production* | *World Share %* | *Reserves (tons)* | *World Reserves (tons)* | *World Share (%)* |
|---|---|---|---|---|---|---|
| *Nickel* | 35.000 | 3.300.000 | 1% | 2.600.000 | 95.000.000 | 3 % |

| | | | | | | |
|---|---|---|---|---|---|---|
| *Gold* | 20 | 3.300 | 0.6% | 1.000 | 57.000 | 2 % |
| *Silver* | 80 | 25.000 | 0.3% | 1.200 | 641.400 | 0,2% |

*Table 4 – Mineral Production (2024) and Reserves in the Dominican Republic*

*(Self-elaboration based on USGS)*

The Dominican Republic presents a differentiated mining profile within LAC, characterized by its high production of nickel and, to a lesser extent, gold. According to data published by the USGS, the Dominican Republic contributes approximately 1.1% of global nickel production, positioning itself as one of the main producers of this mineral in the Caribbean.

Dominican nickel is acquiring increasing relevance in the context of the energy transition due to the use of nickel in batteries, alloys, and strategic industrial applications. In terms of reserves, the Dominican Republic concentrates nearly 2.7% of the world total, which reinforces its relative importance beyond its territorial scale.

Gold production represents another relevant component of the national mining sector, with a share of nearly 0.6% of global production and a proportion of reserves exceeding 1.5% of the global total. While these figures are modest compared to the large regional producers, they position the country as a significant player within the Caribbean.

Silver is produced mainly as a by-product of gold mining, with a marginal share on a global scale. In the case of copper, although no significant production is currently recorded, there are identified resources that could acquire relevance in scenarios of favorable prices and exploratory advances. Taken together, these indicators show that the Dominican Republic possesses a concentrated but strategic mining profile, particularly in nickel, which gives it a specific role within the regional mosaic of critical minerals.

## 3.12. Jamaica

Jamaica is historically distinguished by bauxite mining, a key input for aluminum production, a strategic material for electrification, transport, and the deployment of renewable energy. In this sense, the country positions itself as one of the main bauxite producers in the Caribbean and as a relevant supplier of inputs for industrial chains associated with the energy transition.

According to official information from the Mines and Geology Division (MGD, 2024), in 2023, bauxite and alumina production showed a recovery compared to previous years, driven by favorable international market conditions and the normalization of industrial operations. However, the mining sector maintains a relatively limited participation in the national economy, reflecting a highly concentrated production profile.

While the potential for other critical minerals is limited and there is currently no metallic production beyond bauxite, the accumulated mining experience and existing infrastructure give Jamaica a specific role within the regional context, particularly as a supplier of industrial and construction minerals, such as limestone, sand, gravel, marl, and gypsum, linked to the energy transition.

## 3.13. Cuba

Cuba has one of the world's largest nickel and cobalt resources. These resources position the country as a potential strategic actor in the supply of critical minerals for the energy transition, particularly for the battery industry and advanced technological applications.

The eastern region of Cuba concentrates most of these resources, which have been historically exploited through large-scale operations. Nickel constitutes one of the country's main mining products and a relevant source of external income. However, recent official information (ONEI, 2025) evidences a contraction in production in recent years, reflecting operational and structural limitations of the sector.

Nonetheless, the development of Cuba's mining potential faces limitations associated with energy, technological, financial, and market access factors. From a regional perspective, Cuba represents a case of high geological endowment with energy, technological, financial, and geopolitical restrictions that condition its full integration into the value chains of critical minerals for the energy transition.

## 3.14. Comparative Synthesis

The country analysis evidences a marked heterogeneity in the mining potential of LAC. While some countries have consolidated resources and mature institutions, others present an emerging potential conditioned by technical, social, and institutional factors.

This diversity constitutes, at the same time, a challenge and an opportunity for the region, insofar as it allows for thinking about strategies for cooperation, complementarity, and capacity building at a regional level.

| COUNTRY | MINERALS | STATUS | RELEVANCE |
|---|---|---|---|
| Chile | Copper, Molybdenum, Lithium | Established production | Global leader in copper and key player in lithium |
| Argentina | Lithium, Copper | Production and expansion | Emerging player in lithium |
| Peru | Copper | Established production | Strategic copper supplier |
| Bolivia | Lithium | Early-stage development | High strategic potential |

| | | | |
|---|---|---|---|
| Brazil | Nickel, Manganese, Graphite, Rare Earths, Niobium | Production and advanced exploration | Diversification of critical minerals. Potential REE producer |
| Colombia | Nickel, Copper | Production and exploration | Regional relevance in nickel |
| Ecuador | Copper | Recent expansion | Emerging copper producer |
| Panama | Copper | Conditional development | Relevant potential |
| Jamaica | Bauxite | Historical production | Strategic industrial mineral |
| Dominican Republic | Nickel, Gold | Sustained production | Caribbean supplier of nickel |
| Cuba | Nickel, Cobalt | Historical production | High strategic potential |

*Table 5 – Comparative Summary (Own elaboration)*

# 4. GAPS, CHALLENGES & OPPORTUNITIES

Despite the high mining potential of LAC, the region faces a set of structural gaps that limit its capacity to fully leverage the critical minerals necessary for the energy transition. These gaps manifest in technical, institutional, social, and productive areas and present common patterns among OLACDE member countries.

## 4.1. Geological Gaps

One of the main regional limitations is the heterogeneity in the level of geological knowledge between countries. While some nations have detailed cartography, public databases, and systematic exploration programs, others present significant deficits in basic information. The most relevant gaps include:

- Incomplete coverage of geological and metallogenic cartography.
- Outdated or non-standardized information.
- Limited public access to digital geoscientific data.

These asymmetries affect the capacity to attract investment, plan public policies, and adequately assess regional mining potential.

## 4.2. Institutional and Regulatory Challenges

The institutional and regulatory frameworks associated with mining vary widely across the region. In some countries, the lack of regulatory stability and the overlapping of competencies between different levels of government generate uncertainty and delays in project development. Key common challenges include:

- Long and complex permitting processes.
- Lack of articulation between mining, energy, and environmental policies.
- Limited technical capabilities in some public institutions.

Institutional strengthening and inter-sectoral coordination are key elements to reduce these obstacles.

## 4.3. Socio-environmental Dimension

Social acceptance of mining activity constitutes one of the main conditioning factors for the development of the sector in Latin America and the Caribbean. Conflicts linked to water usage, the protection of sensitive ecosystems, and the rights of local communities have affected numerous projects in the region.

In the context of the energy transition, these challenges gain greater relevance, as critical minerals are essential for technologies considered environmentally sustainable. This poses the need to move toward models of responsible mining with high environmental standards, transparency, and social participation.

## 4.4. Limitations in Value Chain Integration

While the region is a relevant provider of mineral raw materials, its participation in the stages of the supply chain with higher added value remains limited. Most production is exported as concentrates or primary products, with little local transformation. The main limitations include:

- Weak articulation between mining, industry, and the energy sector.
- Insufficient energy and logistics infrastructure in some mining areas.
- Limited development of technological and industrial capabilities.

Overcoming these limitations represents an opportunity to link mining development with industrialization and energy transition strategies.

## 4.5. Opportunities for Regional Cooperation

Despite the identified gaps, LAC has significant opportunities to move toward a more integrated regional approach. Cooperation between OLACDE member countries can contribute to:

- Sharing geological information and best practices.
- Strengthening the technical capabilities of geological services.
- Promoting common standards in mining and sustainability.
- Articulating regional strategies for critical minerals.
- Promoting strategies for verticalization and value addition in LAC critical and strategic mineral value chains.

OLACDE, in its role as an energy cooperation organization, is in a strategic position to facilitate dialogue between mining and energy and to promote a long-term regional vision.

The gaps and challenges facing LAC regarding critical minerals do not negate the region's high potential, but rather highlight the need for comprehensive and coordinated strategies. The energy transition offers a window of opportunity to revalue the role of mining, provided that technical, institutional, social, and productive aspects are addressed simultaneously.

## 4.6. Current Context: Critical Minerals and Energy Security

The analysis of LAC's mining potential carried out in the preceding chapters highlights the close relationship between the availability of critical minerals and the viability of the energy transition. The electrification of the economy, the expansion of renewable energy, and the deployment of storage technologies depend on a secure, sustainable, and affordable supply of strategic minerals.

In this context, mining ceases to be an isolated sectoral activity and becomes a structural component of energy policy, with direct implications for the energy security, economic competitiveness, and sustainable development of OLACDE member countries.

Traditionally, energy security has been associated with the availability and diversification of primary energy sources. However, the transition toward energy systems based on mineral-intensive technologies introduces a new dimension: the security of critical mineral supply.

For Latin America and the Caribbean, this situation presents a dual condition. On the one hand, the region is a relevant provider of strategic minerals globally, which positions it favorably in geopolitical terms. On the other, many countries in the region depend on imports for access to high-value-added technologies, inputs, and energy equipment.

From a regional perspective, strengthening the link between mining and energy allows for:

- Reducing vulnerabilities associated with interruptions in global supply chains.
- Improving the planning of energy infrastructures linked to mining projects.
- Integrating critical mineral considerations into energy security strategies.

## 4.7. Coordination Between Mining and Energy Policies

One of the main challenges identified is the scarce historical articulation between mining and energy policies. In many countries, both sectors have evolved independently, with uncoordinated regulatory frameworks, investment plans, and strategic objectives.

Recent experience in countries of the region shows that the development of large-scale metallic mining entails significant energy requirements, concentrated in a

small number of projects and sustained over time. Technical studies carried out by OLACDE in support of national authorities show that a few mining ventures can demand several hundred megawatts of installed capacity and annual electricity consumption in the order of terawatt-hours, which poses relevant challenges for the planning of generation, transmission, and the reliability of power systems. This scenario highlights the need to strengthen coordination between mining and energy policies, as well as to improve the quality and consistency of the technical information used to project future sector demand.

The energy transition requires overcoming this fragmentation by promoting:

- Joint planning of energy infrastructure for mining zones.
- The use of renewable energy in mining operations to reduce emissions and costs.
- The incorporation of energy efficiency and demand management criteria in the mining sector.

Greater integration between mining and energy can generate relevant synergies, contributing both to the competitiveness of the mining sector and to decarbonization goals.

## 4.8. Productive Development, Value Chains & Sustainability

The region's mining potential offers opportunities to advance beyond the traditional role of a raw material supplier. The growing demand for critical minerals opens the possibility of developing additional links in value chains, linked to transformation, processing, and, in some cases, the manufacturing of components associated with the energy transition.

From an energy perspective, these strategies can:

- Increase the internal demand for clean and reliable energy.
- Stimulate investments in renewable generation and power grids.
- Favor the creation of skilled employment and technological development.

However, the development of value chains requires coordinated industrial, energy, and technological policies, as well as investments in human capital and infrastructure.

The expansion of mining activity in the context of the energy transition poses the challenge of guaranteeing high standards of environmental and social sustainability. The legitimacy of mining as a support for the energy transition depends on its ability to minimize impacts, adequately manage natural resources, and generate tangible benefits for local communities.

From the perspective of regional energy policy, it is key to:

- Promote the use of clean energy in mining.
- Encourage water efficiency practices and the circular economy.
- Promote transparency and social participation in mining projects.

These elements are fundamental to align mining development with the sustainability goals that guide the energy transition.

## 4.9. The Role of OLACDE

OLACDE is in a strategic position to contribute to the construction of a regional agenda on critical minerals and the energy transition. Its experience in energy analysis, technical cooperation, and regional articulation allows it to act as a bridge between the mining and energy sectors.

Possible lines of action include:

- Incorporating mineral analysis into energy studies and scenarios.
- Facilitating the exchange of information and best practices between countries.
- Promoting dialogue between authorities (energy, mining, and environment).
- Supporting regional cooperation initiatives aimed at strengthening technical and planning capabilities.

The mining potential of LAC constitutes a first-order strategic asset in the context of the global energy transition. The region has critical mineral resources that are essential for the development of clean energy technologies and for global supply security.

However, the materialization of this potential requires comprehensive approaches that link mining, energy, environment, and productive development. The energy transition not only redefines energy systems but also the role of mining in regional development. In this scenario, OLACDE member countries have the opportunity to position themselves strategically, not only as providers of critical minerals but as active players in building a more sustainable, resilient, and inclusive energy future.

# 5. ENERGY REQUIREMENTS

## 5.1. Methodology

### 5.1.1. Scope and objective of the study

The objective of this study is to project the electrical energy demand for the mining sector over a ten-year horizon (2024-2034) in selected markets in Latin America and the Caribbean. The purpose of this projection is to contribute information and data to energy-mining sector actors and energy planning agencies to assist in identifying

infrastructure expansion needs and the impact of the energy transition on the region's primary sectors.

The projection is not limited to a linear extrapolation of GDP but seeks to capture multisectoral structural changes, such as the incorporation of generation, self-generation, the electrification of industrial processes, the commissioning of new mining projects, and the evolution of consumption in existing operations.

### 5.1.2. Definition of the universe

In various information sources, the energy consumption of the mining sector is grouped within the "Agriculture/Fishing/Mining" sector. This segment groups final consumers whose main activity is the extraction of natural resources and technified primary production. For the purposes of this study, a distinction is made between countries with data disaggregated by activity and those where national statistics report the block in an aggregated form.

In both cases, the analysis universe centers on the mining chain and includes processing plants and large metallic operations (copper, gold, lithium) that operate as "Large loads" or "Free clients" within the Interconnected Electric Systems (IES), also integrating, in specific cases, high-voltage irrigation systems.

### 5.1.3. Data sources

To provide traceability of the available information, this study starts from a base energy consumption (2024 base consumption) derived from SieLAC, with data validated by OLACDE and their respective national energy balances.

Macroeconomic projections from update reports from Ministries of Economy (e.g., MEF in Peru) and Central Banks (e.g., BCRA in Argentina) were also integrated. Finally, data from national energy planning were incorporated. Reference documents include Decennial Expansion Plans and official programs from technical agencies, such as EPE in Brazil, UPME in Colombia, and PRODESEN in Mexico.

### 5.1.4. Data Adaptability Model (MAD)

Given the heterogeneity of information in the region, this projection is constructed using the Data Adaptability Model (MAD), which applies three levels of analytical depth according to data availability and quality:

**Level I:** Physical planning projection (BAU): Used in countries with mature energy institutions (Brazil, Colombia, Peru). At this level, the projection is built supported by official Generation and Transmission Expansion Plans. The "Base Scenario" or "Reference Case" is prioritized to avoid optimistic biases. The advantage of this approach is that it already considers the technical maturation of projects and

the physical constraints of the grid, translating economic growth into projected GWh directly.

**Level II:** Product-energy elasticity correlation (Emerging mining): Applied in markets with disruptive structural changes, such as Argentina and Guyana. In these economies, historical growth is not a valid predictor of the future due to the entry of "world-class" projects. Regarding methodology, the projected growth rate of physical production or exports is used, and an Energy-Production Elasticity Coefficient (typically between 0.6 and 1.0) is applied. This coefficient allows for modeling how an increase in extracted volume drives electricity demand, considering that new projects are usually more electro-intensive but technologically more efficient.

**Level III:** Homologation by projects and proxies (Marginal sectors): In countries where the mining sector represents a minimal fraction of total consumption or lacks segregated data, the Compound Annual Growth Rate (CAGR) of the national heavy industry is used as a proxy. This method assumes that the dynamics of investment in agriculture or small-scale mining will follow the trend of national electrical infrastructure, applying conservative correction factors to avoid overestimations.

### 5.1.5. Cross-cutting assumptions and limitations

The robustness of this model rests on the following assumptions:

1. **Operational continuity:** Stability of current legal and regulatory frameworks is assumed, ensuring predictability for foreign direct investment in the mining and agro-industrial sectors.
2. **Energy integration:** Progressive migration from thermal self-generation systems to the National Interconnected System is considered, to the extent that marginal generation costs (driven by renewable sources and natural gas) remain competitive against isolated generation.
3. **Energy efficiency:** The projections integrate the "Intensity Effect," assuming an average technological improvement that reduces specific consumption per unit of product over a ten-year horizon.

## 5.2. Current context: Mining and energy security

At the regional level, the mining sector represents 9% of LAC's total electricity demand, with a consolidated consumption of 124,524 GWh in 2024. This participation evidences the sector's strategic role as a consumer of firm energy, although its incidence presents marked heterogeneity according to each nation's productive profile. The regional system is driven by large consumption centers that define the industrial load curve of the sector, integrating both grid operations and self-generation systems.

| Country | Mining Consumption (GWh) | National Demand (GWh) | Share (%) |
|---|---|---|---|
| **Argentina** | 1.256 | 124.291 | 1% |
| **Belize** | 15 | 757 | 2% |
| **Bolivia** | 1.125 | 10.072 | 11% |
| **Brazil** | 46.562 | 579.436 | 8% |
| **Chile** | 28.011 | 76.128 | 37% |
| **Colombia** | 5.897 | 73.520 | 8% |
| **Costa Rica** | 375 | 10.889 | 3% |
| **Cuba** | 177 | 14.699 | |
| **Ecuador** | Not specified | 29.380 | |
| **El Salvador** | 45 | 7.092 | 1% |
| **Guyana** | 64 | 1.046 | 6% |
| **Honduras** | Not specified | 7.842 | |
| **Jamaica** | 18.938 | 30.060 | 63% |
| **México** | 15421 | 307.929 | 5% |
| **Nicaragua** | 97 | 3.914 | 2% |
| **Panamá** | 2.369 | 13.381 | 18% |
| **Peru** | 20.265 | 54.218 | 37% |
| **Dominican Republic** | 1.293 | 19.969 | 6% |
| **Uruguay** | 256 | 12.367 | 2% |
| **Venezuela** | 9 | 57.096 | |
| **LAC** | **124.524** | **1.434.086** | **9%** |

*Table 6 – Characterization of Electricity Consumption in the Mining Sector in LAC (2024)*[5]

The analysis by country highlights Jamaica (63%), Chile (37%), and Peru (37%) as the systems with the highest electrical intensity in this sector. Panama follows with 18% derived from its mining consolidation. In contrast, large-scale and highly diversified economies like Brazil (8%), Colombia (8%), and Mexico (5%) present a structure where the primary sector acts as a stable but complementary load component compared to other industrial segments. Other cases, such as Argentina (1%) or Venezuela, reflect a gap between their resource potential and the formal electricity consumption of the sector.

[5] This section details the electricity demand of the agro-industrial, fishing, and mining sectors relative to total national consumption. The figures reflect the energy intensity of the primary sector in each interconnected system at the end of the base year 2024.

## 5.3. National Energy Projections

### 5.3.1. Regional Outlook of Projections to 2034

Toward the 2034 horizon, the electricity demand of the mining sector in LAC projects a trajectory of structural expansion, with a cumulative regional growth of 62%. This increase, which would raise consolidated consumption to 201,590 GWh, is driven by the change in the productive matrix of the main extractive economies and the progressive electrification of technified agribusiness.

| País | Mining Consumption 2024 (GWh) | 2034 Projection (GWh) | Cumulative Growth (%) |
|---|---|---|---|
| **Argentina** | 1.256 | 6.630 | 425% |
| **Belize** | 15 | 21 | 37% |
| **Bolivia** | 1.125 | 1.468 | 31% |
| **Brazil** | 46.562 | 61.089 | 31% |
| **Chile** | 28.011 | 34.930 | 25% |
| **Colombia** | 5.897 | 7.973 | 35% |
| **Costa Rica** | 375 | 448 | 20% |
| **Cuba** | 177 | 177 | N/D |
| **Ecuador** | | 2927 | 10% |
| **El Salvador** | 45 | 53 | 17% |
| **Guyana** | 64 | 195 | 205% |
| **Honduras** | | 206 | N/D |
| **Jamaica** | 18.938 | 23.063 | 22% |
| **México** | 15421 | 19.933 | 29% |
| **Nicaragua** | 97 | 141 | 45% |
| **Panamá** | 2.369 | 2.724 | 15% |
| **Peru** | 20.265 | 37.465 | 86% |
| **Dominican Republic** | 1.293 | 1.841 | 42% |
| **Uruguay** | 256 | 295 | 15% |
| **Venezuela** | 9 | 11 | 22% |
| **LAC** | **124.524** | **201.590** | **62%** |

*Table 7 – Forecast of Electricity Demand in the Mining Sector in LAC (2024-2034)[6].*

The dynamics of expansion present marked contrasts depending on the level of maturation of national projects. Argentina leads the projected growth rate with a jump of 425%, driven by the commissioning of world-class lithium and copper projects, followed by Guyana, which registers a 205% increase due to the integration of new industrial loads. On the other hand, consolidated economies such as Peru (86%), the Dominican Republic (42%), and Brazil (31%) show an evolution aligned with their

[6] Estimated evolution of electricity consumption based on national expansion plans and sectoral elasticity models. Cumulative growth reflects the projected incorporation of new industrial loads and electrification processes.

official expansion plans, while systems under severe supply constraints, such as Cuba (0%), reflect a scenario of suppressed demand.

### 5.3.2. Argentina

*Emergent expansion and a structural shift*

Argentina represents the case of greatest relative dynamism in the period analyzed. Starting from a sectoral base of 1,256 GWh in 2024 (1% of national consumption), the projection reaches 6,630 GWh in 2034, representing an increase of 425%. This evolution responds to a transformation of the productive profile driven by the consolidation of world-scale copper projects and the maturation of the lithium portfolio under the RIGI framework.

The official macroeconomic projections of the Central Bank of the Argentine Republic (BCRA)[7] anticipate a substantial increase in mining activity toward 2030. A case in point is the Taca Taca project (First Quantum Minerals) in Salta, with an initial processing capacity of 40 Mtpa and a planned expansion to 60 Mtpa. With an estimated production of 291,000 tons of copper per year, this project is positioned as a critical demand node that will require highly reliable energy infrastructure[8] and a capital expenditure (CAPEX) exceeding 5 billion dollars.

The main implication toward 2034 is territorial: the concentration of the portfolio in the provinces of San Juan, Salta, and Catamarca shifts the center of gravity of industrial demand toward the NOA (Northwest) and Cuyo regions. Copper projects in advanced stages, such as MARA (Glencore), El Pachón (Glencore), Josemaría (Lundin Mining), and Los Azules (McEwen Copper), added to lithium deposits such as Centenario-Ratones (Eramet), Sal de Oro (POSCO), and Mariana (Ganfeng Lithium), form a high-energy-intensity cluster in areas with historically limited grid infrastructure. For these projections to materialize, the main challenge lies in transport infrastructure. The viability of this 425% growth depends on the execution of high-voltage (500 kV) works that allow for the evacuation of energy to the sites and, simultaneously, on the integration of in situ renewable sources to meet the carbon footprint standards required by the global market. The exceptional solar radiation of the Puna region presents itself here as a strategic advantage for the hybridization of the mining energy matrix. Without a coordinated expansion of the SADI (Argentine Interconnected System) to accompany the pace of investment under RIGI, the gap between geological potential and operational capacity could become the main bottleneck for the regional energy transition.

[7] BCRA (2024). *Projections of the Trade Balance 2024-2030*. Buenos Aires, p. 3. https://www.bcra.gob.ar/archivos/Pdfs/PublicacionesEstadisticas/proyecciones-de-la-balanza-comercial-2024-2030.pdf

[8] First Quantum Minerals Ltd. (2025). *NI 43-101 Technical Report: Taca Taca Project, Salta* https://www.first-quantum.com/wp-content/uploads/2026/02/Taca-Taca-Project-Technical-Report-2025-FINAL.pdf

### 5.3.3. Belize

*Primary demand in a small-scale electrical system*

Belize registered a consumption of 15 GWh linked to its primary activities in 2024, representing 2% of national electricity demand (757 GWh). This starting point reflects a reduced-scale electrical system, where the primary sector has a predominantly agro-industrial character and operates as a point load within the grid. The sector's incidence is marginal compared to the commercial and services segments, which dominate the country's consumption profile.

The projection toward 2034 estimates a consumption of 21 GWh, representing a cumulative growth of 37%. This evolution is based on the National Energy Policy (2024)[9], which projects a Compound Annual Growth Rate (CAGR) of 3.2% for the national electrical system. Under this scenario, it is assumed that the mining sector's demand will accompany the general expansion of the system, maintaining a stable trend without the incorporation of large-scale industrial projects.

From the perspective of electrical planning, the challenge toward 2034 lies in the reliability of the supply and the resilience of the grid in the face of extreme weather events. Given that sectoral growth is moderate, investments are concentrated on strengthening electrical infrastructure and integrating local renewable generation, with the objective of reducing dependence on energy imports.

[9] Ministry of Energy (Belize). (2024). National Energy Policy and Strategic Demand Projections. Belmopan, Belize.

### 5.3.4. Bolivia

*Industrial consolidation and synchronization with the SIN*

Bolivia registered a consumption of 1,125 GWh in the mining sector in 2024, representing 11% of national electricity demand (10,072 GWh). This participation reflects a relevant sectoral incidence within an intermediate-scale electrical system, where mining and industrial activity acts as a structural component of the National Interconnected System (SIN).

The projection toward 2034 estimates a demand of 1,468 GWh, equivalent to a cumulative growth of 30.5% over the decade. The methodological foundation integrates the forecasts of distribution agents and large industrial consumers, applying, under a conservative methodological criterion, a unit sectoral elasticity[10]. The modeled trajectory contemplates an acceleration in the 2025-2026 biennium, linked to strategic industrialization projects such as the Oruro Zinc Refinery and advancements in infrastructure for Direct Lithium Extraction (DLE), to then converge toward technical stabilization rates of 2% annually.

The critical challenge for Bolivian electrical planning lies in the timely expansion of transport infrastructure and reinforcements in high-load nodes, especially in the departments of Oruro and Potosí. Given the relative weight of the sector in the national balance, any mismatch in the schedule of industrialization projects would directly impact aggregate demand, conditioning the efficiency of generation investments. The sustainability of the model will depend on the SIN's capacity to integrate these loads while maintaining optimal levels of reserve and operational stability.

[10] National Load Dispatch Committee (CNDC). (2024). Annual Report and Results of the National Interconnected System. La Paz, Bolivia, p. 18. https://www.cndc.bo/home/media/memyres_2024.pdf

### 5.3.5. Brazil

*Integrated expansion in a diversified matrix*

Brazil registered a consumption of 46,562 GWh in 2024 for the mining sector, consolidating itself as the market with the largest absolute volume in the region. This figure represents 8% of a national demand of 579,436 GWh, confirming a mature and diversified electrical structure where the extractive-metallurgical sector acts as a stable component of the high-voltage load without dominating the productive matrix.

The projection toward 2034 estimates a consumption of 61,089 GWh, which implies a cumulative growth of 31.2%. This trajectory is based on the 2034 Ten-Year Energy Expansion Plan (EPE)[11], which foresees sustained expansion based on the consolidation of installed capacities. At the sectoral level, the dynamics respond to the evolution of mature production chains, particularly in the iron, alumina, and non-ferrous metal segments, where growth is moderated by energy efficiency improvements of approximately 10% by the end of the period.

This behavior is supported by the operation of global-scale assets, such as the **S11D Carajás** complex, operated by Vale, considered the largest iron ore complex in the world. Currently, this operation reaches a scale of nearly 83 Mtpa and projects its expansion to 120 Mtpa through the development of the **Serra Sul 120** project. Toward the end of the analyzed horizon, the sector's growth will tend to diversify toward critical minerals for the energy transition, with the development of high-energy-intensity nickel projects, such as **Araguaia** (Horizonte Minerals), and the expansion of the lithium hub in the **Jequitinhonha Valley** (Sigma Lithium). These beneficiation and refining processes offset the operational maturity of traditional deposits and sustain the projected expansion.

In this context, the evolution of the mining sector is consistently integrated into the general performance of the National Interconnected System (SIN), consolidating itself as a stable component of high-voltage demand. Looking ahead to 2034, the main technical challenge lies in maintaining supply reliability within a large-scale system, ensuring that the incorporation of these new industrial loads, marked by increasing mineral intensity, is articulated with basic grid planning without creating imbalances in the national dispatch profile.

[11] Energy Research Office (EPE). (2024). 2034 Ten-Year Energy Expansion Plan. Ministry of Mines and Energy. Brasilia, Brazil, pp. 38-39. https://www.epe.gov.br/sites-pt/publicacoes-dados-abertos/publicacoes/PublicacoesArquivos/publicacao-804/topico-758/PDE2034_Aprovado.pdf

### 5.3.6. Chile

*Consolidation and technological deepening*

Chile represents the stage of greatest mining-electrical maturity in the region. With a sectoral demand of 28,011 GWh in 2024 and a projection of 34,930 GWh toward 2034, the estimated growth reaches 24.7% over the decade. This trajectory reflects a moderate structural expansion on an already highly electrified base, in a system where mining constitutes a central component of high-voltage demand.

Sectoral dynamics respond to the progressive substitution of fossil fuels at mining sites and the incorporation of desalination infrastructure for water supply in the north of the country. This increase in specific energy consumption is conditioned by geological factors, mainly the aging of deposits and the consequent decrease in ore grades, which requires higher technical requirements for grinding and concentration processes. A representative case is Minera Escondida (BHP), the country's largest individual electricity consumer, which has consolidated a supply model based entirely on seawater, increasing the share of high-power pumping systems in its energy cost structure.

Toward 2034, the dynamism of the sector will be driven by the National Lithium Strategy, which seeks to expand the production capacity of the Salar de Atacama beyond the current 210,000 tpa. The management of strategic assets by Codelco, including the integration of Salar Blanco, and the advancement of projects in Maricunga and Salares Altoandinos (Enami), form a demand node linked to high-purity chemical processing plants. This flow of projects, added to copper milestones such as Nueva Centinela (Antofagasta Minerals), with an investment of US$ 4.4 billion, reaffirms the operational continuity of the mining matrix.

According to the projections of the National Energy Commission (CNE)[12], sectoral growth responds to the modernization and expansion of existing assets in a stable regulatory environment. In this context, toward 2034, the main challenge lies in guaranteeing a reliable, competitive, and increasingly decarbonized electricity supply, in line with international standards, in order to sustain the competitiveness of the Chilean mining sector in the long term.

[12] National Energy Commission (CNE). (2023). Preliminary Technical Report on Electricity Demand Forecast 2023-2043. Santiago, Chile, pp. 25-28. https://www.cne.cl/wp-content/uploads/2023/12/Informe-Preliminar-Prevision-de-Demanda-Electrica-2023-2043.pdf

### 5.3.7. Colombia

*Incremental electrification in a transitioning matrix*

Colombia registered a sectoral consumption of 5,897 GWh in 2024, equivalent to 8% of national electricity demand (73,520 GWh). In a system characterized by the preponderance of residential and commercial segments, mining-industrial demand is positioned as a relevant component whose evolution acquires a strategic role in the energy transition process, particularly as a vector for the electrification of fuel-intensive consumptions.

The projection toward 2034 estimates a consumption of 7,973 GWh, representing a cumulative growth of 35.2%. This trajectory is consistent with the scenarios developed by the Mining and Energy Planning Unit (UPME)[13], particularly those that incorporate the expansion of Special Large Consumers (GCE). The projected growth is supported by the substitution of energy sources in mining transport fleets and by the technification of production processes, configuring a structural change in the sector's load profile.

At the operational level, this evolution is supported by the consolidation of underground mining assets, such as Buriticá (Zijin Mining Group), which demands a continuous and stabilized electricity supply for ventilation and pumping systems. Toward the end of the analyzed horizon, the dynamism of the sector is conditioned by the development of industrial-scale copper projects, among which the potential of Quebradona (AngloGold Ashanti) stands out, whose integration would require new high-power loads with high reliability standards.

In a system with high dependence on hydroelectric generation, the incorporation of new mining-industrial demand intensifies exposure to hydrological variability, particularly for continuous operation loads. In this context, toward 2034, the central challenge lies not only in expanding transmission capacity but in synchronizing that expansion with an effective diversification of the electrical matrix. The system's capacity to absorb new firm demand without compromising supply reliability will ultimately depend on integrated planning that articulates mining development with the incorporation of non-conventional renewable sources.

[13] Mining and Energy Planning Unit (UPME). (2024). Electricity Energy Demand and Maximum Power Projection Report. Ministry of Mines and Energy. Bogotá, Colombia, p. 48. https://www1.upme.gov.co/DemandayEficiencia/Documents/Informe_de_proyeccion_de_demanda_de_energia_electrica_y_potencia_maxima_Rev_dic2024.pdf

### 5.3.8. Costa Rica

*Sectoral stability in a diversified matrix*

Costa Rica registered a consumption of 375 GWh in 2024 associated with its primary and processing activities, representing 3% of national electricity demand (10,889 GWh). This participation reflects the structure of a diversified economy consolidated in the services, advanced manufacturing, and tourism sectors, where the extractive-metallurgical component is marginal due to definitions in the national regulatory framework.

The projection toward 2034 estimates a consumption of 448 GWh, representing a cumulative growth of 19.5%. This trajectory is based on the expansion scenarios of the Costa Rican Electricity Institute (ICE)[14], under a moderate growth trend aligned with the country's macroeconomic dynamics. The projected expansion does not respond to an extension of the mining frontier, but to the execution of water infrastructure projects and the incorporation of high-efficiency technologies in agro-industrial processes.

Standing out in this horizon is the impact of structural programs such as the Water Supply Project for the Middle Basin of the Tempisque River (PAACUME), whose electrical pumping demand for technified irrigation constitutes an intensive and constant load in the Guanacaste region. Likewise, the trajectory to 2034 integrates the modernization of export clusters (coffee, sugarcane, and pineapple), where the transition toward electric drying and refrigeration systems progressively substitutes the use of fossil fuels, leveraging the national decarbonization goal.

From the perspective of electrical planning, the challenge toward 2034 lies in efficient regional distribution management and maintaining supply reliability in rural areas. System planning is aimed at strengthening the resilience of low and medium-voltage grids to absorb gradual increments of dispersed industrial demand, preserving the integrity of an electrical matrix with a share of renewable sources close to 100%.

[14] Costa Rican Electricity Institute (ICE). (2023). Generation Expansion Plan 2022-2040. San José, Costa Rica. https://www.grupoice.com/wps/wcm/connect/20b300e4-c4df-4994-b1b1-372726fa4f3b/PLAN+DE+EXPANSION+DE+LA+GENERACION+ELECTRICA+2024-2040.pdf?MOD=AJPERES&CVID=pFal9fj

### 5.3.9. Cuba

*Structural constraints and load management*

In 2024, Cuba registered a consumption of 177 GWh in its agro-industrial and extractive activities, equivalent to 1% of a national demand of 14,699 GWh. The Cuban electrical system faces structural constraints in generation availability, with a critical reduction in operational capacity and recurring episodes of supply deficits. In this context, the National Electric System (SEN) operates under programmed load management schemes, where supply is prioritized for residential consumption and essential services, limiting availability for intensive industrial processes.

Given these conditions, the projection toward 2034 contemplates a 0% CAGR, keeping the mining sector's consumption stagnant at 177 GWh. This scenario, supported by the National Office of Statistics and Information (ONEI)[15] and the National Electric Union (UNE)[16], reflects the structural constraints faced by the system to expand its capacity during the analyzed period. In terms of electrical planning, the agro-industrial sector does not act as a driver of demand growth, but rather as a component of limited load whose operation depends on the system's energy availability in a context of restricted supply.

From an infrastructure perspective, the challenge for Cuba toward 2034 lies exclusively in operational sustainability and the recovery of technical availability. The absence of projected growth evidences a scenario of suppressed demand, where the country's natural resource potential is decoupled from its formal electricity supply capacity, conditioning any attempt at industrial modernization in the short and medium term.

[15] National Office of Statistics and Information (ONEI). (2025). Mining and Energy - AEC 2024. Havana, Cuba. https://www.onei.gob.cu/sites/default/files/publicaciones/2025-07/10-mineria-y-energia_aec2024.pdf

[16] National Electric Union (UNE). (2026). Operational Report of the National Electric System (released by official media).

### 5.3.10. Ecuador

*Consolidation of mining-energy demand*

Ecuador is undergoing a structural transformation in its productive matrix, evolving from a model dominated by artisanal mining toward the development of industrial metallic mining. This process is linked to the growing interest in copper and gold resources within a global context of energy transition. In this scenario, the country is beginning to consolidate itself as an emerging player in the South American mining landscape, with a project portfolio that could significantly reshape the structure of its electricity demand over the next decade.

The expansion of the Mirador Mine – Phase II (Ecuacorriente S.A.), located in Zamora Chinchipe, stands out as one of the main industrial loads, with a projected maximum capacity of 185 MW and an estimated annual consumption of 1,150 GWh at full operation. Likewise, the Cascabel project (SolGold), currently at an advanced stage, represents the largest projected demand milestone by 2034. With an estimated capacity of 180 MW and annual consumption close to 1,570 GWh, this underground operation will require high-voltage infrastructure to sustain electro-intensive mineral processing activities.

Taken together, the development of the main assets could result in a sectoral electricity consumption of 2,927 GWh by 2034, with an aggregated maximum capacity of approximately 565 MW. This level of demand reflects the energy-intensive nature of modern operations, particularly in the crushing, grinding, and flotation stages[17].

Looking ahead to the ten-year horizon, the consolidation of this demand poses significant challenges for national energy planning. The location of the main projects in mountainous and Amazonian regions requires progress in the expansion of transmission infrastructure to ensure the supply of large-scale industrial operations. Additionally, the high share of hydropower generation within Ecuador's electricity matrix introduces further considerations related to hydrological variability and the need to secure firm capacity for loads with high utilization factors. In this context, coordination between the development of the country's mining potential and the expansion of the power system will be crucial to ensure supply reliability and to support the projected long-term growth of the sector.

[17] Latin American and Caribbean Energy Organization (OLACDE). (2025). Technical Assistance: Report for the Mining-Energy Sector of Ecuador - Technical Findings and Energy Consistency (pp. 8-10). Quito, Ecuador.

### 5.3.11. El Salvador

*Sectoral stability and regulatory change potential*

El Salvador allocated 45 GWh in 2024 to the operation of its agro-industrial sectors, representing 1% of its national electricity demand (7,092 GWh). This participation reflects an economic matrix oriented toward manufacturing and services, where the primary sector acts as a complementary load concentrated in the processing of traditional agricultural products.

The projection toward 2034 estimates a consumption of 53 GWh, representing a cumulative growth of 16.96%. This calculation is aligned with the Base Scenario of the Indicative Expansion Plan (DGEHM)[18], applying a Compound Annual Growth Rate (CAGR) of 1.58%. However, the planning warns of a potential upward bias associated with the updating of the regulatory framework for metallic mining, which establishes the technical conditions for the eventual development of extractive projects in the medium term.

From an infrastructure perspective, the sector's current demand does not require grid expansions based on load volume. Toward 2034, the challenge focuses on modernizing distribution infrastructure and integrating new generation technologies. However, the eventual incorporation of mining operations under the new legal framework would require a reassessment of transport capacity in specific nodes to sustain higher-intensity industrial loads.

[18] General Directorate of Energy, Hydrocarbons, and Mines (DGEHM). (2021). Indicative Generation Expansion Plan 2021-2031. San Salvador, El Salvador. https://estadisticas.dgehm.gob.sv/wp-content/uploads/2021/06/Plan-indicativo-de-la-generaci%C3%B3n-de-la-expansi%C3%B3n-2021-2031.pdf

### 5.3.12. Guyana

*Structural transformation and convergence toward the grid*

Guyana registered a consumption of 64 GWh in the mining sector in 2024, representing 6% of national electricity demand (1,046 GWh). Although the absolute volume is small in regional comparison, its evolution has critical systemic importance due to the small scale of the current generation park. The sector is undergoing a transition phase, where the end of the era of isolated self-generation marks the beginning of an accelerated expansion of grid-connected demand.

The projection for 2034 estimates a consumption of 195 GWh, representing a cumulative growth of 205%. This trajectory is aligned with the GPL Development and Expansion Programme *2024-2028*[19], which foresees an accelerated expansion of industrial sales driven by the incorporation of currently self-generated demand into the grid, within the framework of the Gas-to-Energy project. The methodology applies a CAGR of 23% for the initial phase of large-load integration, followed by a stabilization rate of 5% annually, reflecting the normalization of demand after the structural leap derived from the new availability of associated gas.

From the perspective of electrical planning, the growth of the mining sector implies a profound modification in the system's load structure. The incorporation of large mining and industrial consumers will require a coordinated expansion of generation and transmission to avoid operational constraints. In a small-scale system, the materialization of the projected demand will depend strictly on the synchronization between gas infrastructure and national electrical transport capacity.

[19] Guyana Power & Light Inc. (GPL). (2024). Development and Expansion Programme 2024–2028. Georgetown, Guyana, p. 86. https://gplinc.com/pl/plc/media/DE-Programme_2024-2028-26.02.2024-per-PUC-Clarifications.pdf

### 5.3.13. Honduras

*Projected demand in a predominantly non-industrial system*

Honduras registered a national electricity demand of 7,842 GWh in 2024. Official statistics do not present a specific disaggregation of consumption corresponding to the agricultural and mining sector, reflecting a reporting structure centered on residential, commercial, and light industrial segments, particularly associated with the maquila (assembly) industry. In this context, agro-industrial and extractive activities constitute a limited load within the system, with a presence localized in the productive corridors of the north and west of the country.

On this basis, the projection toward 2034 estimates a sectoral consumption close to 206 GWh, which would imply a cumulative growth of around 22% in the analyzed period. This trajectory is consistent with the expansion scenarios considered by the National Electric Energy Company (ENEE)[20], which anticipate a gradual evolution of industrial demand, without significant structural changes in the system's composition.

In this context, toward 2034, the main challenge lies not in the magnitude of the demand, but in the system's capacity to improve its operational conditions. Strengthening the transmission grid and reducing technical and non-technical losses are necessary conditions to sustain the incorporation of new productive loads, in a system where supply reliability continues to be a critical factor for industrial development.

[20] National Electric Energy Company (ENEE). (2025). Draft Report: Indicative Generation Expansion Plan 2026-2035. Tegucigalpa, Honduras. https://cnd.enee.hn/wp-content/uploads/2025/09/Borrador-Informe-PIEG-2026-2035.pdf

### 5.3.14. Jamaica

*Demand structure and electro-intensity of alumina*

Jamaica presents an electricity demand configuration characterized by high concentration in the mining-industrial segment, particularly in the bauxite value chain and alumina refining. In 2024, this sector registered a consumption of 18,938 GWh, equivalent to 63% of national electricity demand (30,060 GWh), consolidating itself as the main determinant of base load in the island's electrical system.

The projection toward 2034 estimates a consumption of 23,063 GWh, representing a cumulative growth of 22%. This trajectory is supported by the recovery and modernization of installed capacity, in a context where energy cost and operational efficiency constitute central factors for the sector's competitiveness[21].

At the operational level, the dynamics of the period are linked to the reactivation and optimization of the country's main alumina complexes. The reactivation of Alpart (JISCO) stands out, the entry into operation of which will imply a relevant increase in electricity demand. Likewise, the continuity of assets such as Jamalco, Windalco (UC Rusal), and Noranda Bauxite operations configures a load curve with high utilization levels and low variability in the short term.

In this context, toward 2034, the main challenge lies in guaranteeing a reliable and competitive electrical supply that allows for sustaining refining activity, while simultaneously ensuring stable operating conditions for the system as a whole. Given the structural weight of the sector in national demand, energy planning must contemplate the management of large-scale loads with high operational continuity, the variation of which directly impacts the system's balance. Likewise, the high dependence of these industries reinforces the need to diversify the generation matrix and reduce exposure to high energy costs, in an environment where the competitiveness of the mining-industrial sector is closely linked to the availability and quality of electricity supply.

[21] Ministry of Science, Energy, Telecommunications and Transport (MSETT). (2024). *National Energy Balance 2024 Update: Audit and Industrial Demand Projections*. Kingston, Jamaica. https://www.mset.gov.jm/wp-content/uploads/2021/07/MSETT-National-Energy-Balance-2024_Update.pdf

### 5.3.15. México

*Mining-industrial integration in a diversified manufacturing system*

In 2024, Mexico registered a sectoral consumption of 15,421 GWh, representing 5% of its national demand of 307,929 GWh. This participation reflects an electrical matrix strongly oriented toward manufacturing, in which the mining-metallurgical sector plays a relevant role as a supplier of strategic inputs within a highly integrated industrial framework.

The projection toward 2034 estimates a consumption of 19,933 GWh, representing a cumulative growth of 29.3%. This trajectory is consistent with the planning scenarios of the Development Program of the National Electric System (PRODESEN 2024-2038)[22], which identifies large industry as one of the main drivers of demand expansion. In this context, the sector's dynamism is linked to the deepening of production chains associated with the industrial relocation process (nearshoring), which increases the demand for basic and refined metals in the domestic market.

At the operational level, the projected growth is supported by the consolidation and optimization of large-scale assets in the mining belt of the north of the country. Units such as Buenavista del Cobre (Grupo México) stand out, with a high power demand for leaching and concentration processes, as well as the consolidation of new polymetallic projects such as Juanicipio (Fresnillo plc/Mag Silver). Likewise, medium-term planning incorporates the potential development of the lithium value chain in the state of Sonora, the eventual materialization of which would imply the incorporation of high-energy-intensity beneficiation processes into the National Electric System (SEN).

In this context, toward 2034, the main challenges for the SEN are concentrated in the expansion and modernization of transmission infrastructure in the North, Northwest, and Northeast regions of the country, where the main mining-industrial loads are located. The system's capacity to accompany this growth will depend on the coordination between electrical planning and industrial development to guarantee reliable and competitive supply conditions in strategic productive hubs.

[22] Secretariat of Energy (SENER). (2024). Development Program of the National Electric System 2024-2038. Mexico City, Mexico. https://www.cenace.gob.mx/Docs/16_MARCOREGULATORIO/Prodecen/20%202024-2038%20Cap%C3%ADtulos%201%20al%206.pdf

### 5.3.16. Nicaragua

*Moderate primary demand in an intermediate-scale system*

Nicaragua registered a consumption of 97 GWh in 2024 associated with the mining and agro-industrial sectors, equivalent to 2% of the national electricity demand (3,914 GWh). This level of participation reflects a primary sector of moderate scope, whose demand is concentrated in agro-industrial activities, mainly sugar and coffee, and in metallic mining operations that generate localized loads outside the main urban centers.

The projection toward 2034 estimates a consumption of 141 GWh, implying a cumulative growth of 45% over the decade. This trajectory is consistent with the expansion scenarios considered by the National Electric Transmission Company (ENATREL)[23], in line with the evolution of productive demand and the expansion of electrical coverage. The projected growth is supported by the operational continuity of relevant mining assets such as La Libertad and El Limón, operated by Calibre Mining, as well as San Albino, developed by Mako Mining, which add relatively stable demands to the system.

In this context, planning challenges are mainly linked to the territorial distribution of demand. Given that agro-industrial and mining loads are located in regions far from the system's main nodes, the expansion and strengthening of the transmission network are key factors in ensuring adequate supply conditions. Toward 2034, the system's capacity to accompany these gradual increases will depend on improvements in transport infrastructure and the consolidation of operational reliability in areas with lower relative electrical development.

[23] National Electric Transmission Company (ENATREL). (2024). Indicative Generation Expansion Plan 2024-2038. Managua, Nicaragua. https://www.mem.gob.ni/wp-content/uploads/2023/11/Plan_Indicativo_Expansion_Generacion_Electrica_2021-2035-Final.pdf

### 5.3.17. Panamá

*Stabilization and resilience in high-density nodes*

Panama registered a sectoral consumption of 2,369 GWh in 2024, representing an 18% incidence on the national electricity demand of 13,381 GWh. This participation reflects the incorporation of large-scale industrial loads into a system historically oriented toward services and logistics, where the recent development of metallic mining has modified the demand structure and its territorial distribution.

The projection toward 2034 estimates a consumption of 2,724 GWh, reflecting a cumulative growth of 15%. This trajectory is consistent with the planning scenarios developed by the Electric Transmission Company S.A. (ETESA)[24], under a moderate expansion approach. The ten-year horizon assumes the stabilization of existing demand, without the incorporation of new large-scale mining projects, and with growth associated mainly with the operational continuity of current assets and the evolution of agribusiness.

From the perspective of the electrical system, the main challenge lies in the management of geographically concentrated intensive loads, particularly in areas far from the main generation centers. In this context, the expansion and adaptation of the transmission network is decisive for sustaining adequate supply conditions. Toward 2034, system planning must focus on reinforcing the reliability of the nodes with the highest demand to guarantee operational stability in the face of contingency events and the variability inherent in a system with high exposure to climatic factors.

[24] Electric Transmission Company S.A. (ETESA). (2020). Indicative Generation Plan 2020-2034, Volume II. Panama City, Panama. https://www.etesa.com.pa/documentos/Tomo_II__Plan_Indicativo_de_Generacin_2020__2034-1992306952.pdf

### 5.3.18. Peru

*Structural expansion and deepening of energy intensity*

Peru registered a sectoral consumption of 20,265 GWh in 2024, consolidating itself as the main driver of industrial electricity demand in the Andean region and representing 37% of national consumption (54,218 GWh). The projection toward 2034 places demand at 37,765 GWh, representing a cumulative growth of 86.4%[25]. This expansion is based on a dual dynamic: the incorporation of new mega-projects and the increase in energy intensity in existing operations.

The dynamism of the period is explained by the commissioning of technically complex assets scheduled for the 2028-2033 period. Notable among them are Yanacocha Sulfuros (Newmont), which marks the transition toward the processing of more complex minerals, and the reactivation of Tía María (Southern Copper), with an estimated capacity of 120,000 tons of copper per year. These initiatives, along with developments in the construction stage such as San Gabriel (Buenaventura) and the Toromocho Expansion (Chinalco), will integrate new load nodes that require high power availability for SAG (Semi-Autogenous Grinding) milling and flotation processes.

Parallelly, a significant fraction of the projected growth, approximately 17,500 additional GWh, responds to the operational evolution of mature deposits such as Antamina, Cerro Verde, Las Bambas, and Quellaveco. In these operations, the progressive decrease in ore grades forces the processing of larger volumes of material to maintain production levels, increasing the specific energy consumption per ton. Added to this is the complexity of water management, where operations such as Toquepala and Cuajone (Southern Copper) demand intensive pumping systems and infrastructure for desalination and seawater transport.

In this context, the robustness of the National Interconnected Electric System (SEIN) will be decisive. The expansion of transmission infrastructure, particularly in the southern mining corridor and the central highlands, is indispensable to enable the projected demand trajectory. National energy planning must prioritize the strengthening of these high-voltage nodes to guarantee the operational stability of a sector that defines the load curve and energy dispatch profile of the country toward 2034.

[25] Ministry of Energy and Mines (MINEM). (2025). Portfolio of Mining Investment Projects 2025. Lima, Peru. https://cdn.www.gob.pe/uploads/document/file/8000189/6722917-cpim-2025.pdf?v=1755709882

### 5.3.19. Dominican Republic

*Industrial load management in an island system*

The Dominican Republic registered a sectoral consumption of 1,293 GWh in 2024, equivalent to 6% of the national electricity demand (19,969 GWh). The Interconnected National Electric System (SENI) has an island configuration, where the incorporation of large industrial loads requires careful planning of generation capacity and grid operation. In this context, the system is characterized by the coexistence of private self-generation schemes with public grid demand, particularly in the nodes of the central region.

The projection toward 2034 estimates a consumption of 1,841 GWh, representing a cumulative growth of 42.4%. This trajectory is based on the National Energy Plan (PEN 2022-2036)[26], in scenarios that contemplate the expansion of mining-industrial activity. Unlike continental systems, this growth requires coordinated generation planning to guarantee sufficient capacity and avoid pressure on system costs when incorporating new high-power loads.

At the operational level, the evolution of the sector is linked to the optimization of the country's main metallic deposits. The expansion of the Pueblo Viejo processing plant (Barrick Gold/Newmont) stands out, aimed at sustaining production levels of approximately 586,000 ounces per year by treating larger volumes of ore, which increases the energy intensity of the complex. Likewise, the continuity of operations such as Cerro de Maimón (Cormidom), focused on the production of copper and zinc concentrates through underground mining, reinforces the need for a reliable electricity supply for processes such as ventilation and milling.

From the network perspective, the consolidation of this demand toward 2034 will require the strengthening of transmission infrastructure, particularly at the 230 kV and 138 kV levels in the country's central axis. The main challenge for the SENI lies in integrating these loads while maintaining frequency stability and avoiding constraints in transformation capacity, ensuring adequate operational conditions in a limited-scale system.

[26] National Energy Commission (CNE). (2022). National Energy Plan 2022-2036. Santo Domingo, Dominican Republic. https://datacne.gob.do/tablero-dinamico/demanda-electrica-nacional

### 5.3.20. Uruguay

*Marginal demand in a consolidated electrical matrix*

Uruguay registered a consumption of 256 GWh in 2024 associated with extractive activities and technified rural development, equivalent to 2% of the national electricity demand (12,367 GWh). Despite being an economy with a strong agro-export base, the direct electricity consumption of the primary sector within the grid remains limited compared to residential, commercial, and industrial demand. This is due to a productive structure in which the greatest energy use is concentrated in later stages of processing.

The projection toward 2034 estimates a demand of 295 GWh, implying a cumulative growth of 15.16% during the analyzed period. This trajectory is in line with the energy planning scenarios considered by the National Administration of Power Plants and Electrical Transmissions (UTE)[27], under assumptions of moderate economic growth and gradual electrification of production processes. The projected increase is mainly linked to the expansion of electric irrigation systems and the modernization of some smaller-scale extractive activities, maintaining a relatively stable sectoral share within total consumption.

In this context, the implications for national electrical planning are limited in terms of capacity expansion. In a system characterized by a high penetration of renewable energy, the main challenge lies in the efficient management of demand and the reliability of supply in rural distribution networks. Toward 2034, the primary sector will continue to be a stable and predictable source of consumption, without requiring significant expansions in national transmission infrastructure.

[27] National Administration of Power Plants and Electrical Transmissions (UTE). (2024). Annual Report and Business Plan. Montevideo, Uruguay. https://www.gub.uy/ministerio-industria-energia-mineria/comunicacion/publicaciones/plan-expansion-generacion-2024-2043

### 5.3.21. Venezuela

*Suppressed demand and conditioned recovery of installed capacity*

Venezuela registered a consumption of 9 GWh in its extractive and agro-industrial activities in 2024, representing a participation close to 0% of an estimated national demand of 57,096 GWh. This figure evidences the low energy intensity of the formal sector compared to the country's productive potential, as a result of the prolonged operational crisis of the National Electric System (SEN). Recurring supply interruptions and capacity constraints have shifted part of the industrial demand toward self-generation schemes or directly toward operational paralysis. In this context, the mining sector is in a situation of suppressed demand, where existing electrical infrastructure fails to capture the productive potential of strategic sectors.

The projection toward 2034 estimates a marginal increase to 11 GWh, reflecting a cumulative growth of 22%. This trajectory is based on a 2% CAGR[28], derived from the expectation of recovering firm power availability starting from the technical rehabilitation programs initiated toward the end of 2025.

In this scenario, Venezuelan electrical planning faces a fundamentally reconstructive challenge: the growth of the mining sector will depend directly on the stabilization of the transmission grid, the operational recovery of generation units, and the reduction of rationing episodes that currently condition industrial activity.

[28] National Electric Corporation (CORPOELEC). (2025). Update Report on Technical Cooperation Agreements for the Rehabilitation of the SEN. Caracas, Venezuela.

# 6. CONCLUSIONS

The global energy transition is structurally redefining the relationship between energy, natural resources, and economic development. In this new context, critical minerals are consolidated as indispensable strategic inputs for electrification, the deployment of renewable energies, energy storage, and the modernization of power systems. The analysis developed in this technical note confirms that LAC occupies a central position in this process due to its geological endowment and its as-yet-unfully-developed mining potential, holding nearly 25% of global critical mineral production (OLACDE, 2025).

The region concentrates a significant proportion of global resources and production of key minerals such as copper and lithium, and presents relevant potential for other critical minerals, including nickel, manganese, graphite, and rare earth elements. This combination of consolidated resources and emerging potentials positions OLACDE member countries as strategic actors in the global supply chains linked to the energy transition.

However, mere resource availability does not guarantee automatic benefits in terms of economic development, energy security, or sustainability. The effective utilization of the region's mining potential is conditioned by a set of structural gaps that persist in different countries, including asymmetries in geological knowledge, institutional weaknesses, socio-environmental challenges, limited articulation between mining, energy, and industrial policies, and a growing need for electrical energy to support the development of new mining ventures.

The comparative analysis by country reveals significant heterogeneity within the region. While some countries possess consolidated mining sectors and relatively robust institutional frameworks, others present relevant potential still in incipient stages of development. This diversity, far from constituting a weakness, can become a strength if regional cooperation schemes oriented toward information exchange, technical capacity building, and the construction of shared strategic visions are promoted.

From an energy perspective, the availability of critical minerals introduces a new dimension to the concept of energy security, traditionally focused on access to primary energy sources. The transition toward mineral-intensive energy systems demands incorporating the analysis of the supply of these inputs into medium- and long-term energy planning. In this sense, the articulation between mining and energy emerges as a strategic axis to reduce vulnerabilities, optimize investments in infrastructure, and move toward more resilient energy systems.

The growing demand for critical minerals creates favorable conditions for advancing toward integration into value chains, promoting higher levels of processing, value

addition, and technological innovation. However, these opportunities can only be materialized through coordinated policies that integrate mining, energy, industrial, and environmental objectives.

The socio-environmental dimension constitutes a transversal and determining factor. The legitimacy of mining as a support for the energy transition depends on its capacity to operate under high standards of sustainability, minimize environmental impacts, manage water resources responsibly, and guarantee processes of participation and dialogue with local communities. Coherence between climate objectives and mining sector practices is essential to consolidate social support for the energy transition.

In this context, OLACDE is in a strategic position to contribute to the construction of a regional agenda that integrates mining and energy. Its role as a cooperation organization allows it to facilitate dialogue between countries, promote common approaches, and provide technical analyses that incorporate the critical mineral dimension into regional energy planning. The systematic inclusion of these topics in OLACDE's studies, scenarios, and cooperation programs can strengthen the region's capacity to address the challenges of the energy transition in a coordinated manner.

Based on this technical vision, the prospective results of this study confirm that the energy needs of the mining sector will represent one of the greatest expansion challenges for regional infrastructure in the 2034 horizon. **With a current 9% share in LAC's electricity consumption, a cumulative growth of 62% in the sector's demand is projected**, representing a net increase of approximately 77TWh. This demand trajectory, validated through the MAD, evidences that the viability of mining projects will depend on guaranteeing the availability of firm power and the expansion of the transmission networks necessary to sustain this new configuration of regional industrial load.

In summary, LAC possesses a strategic mining potential that can become a pillar of the region's energy and sustainable development. Transforming this potential into concrete benefits will require a long-term vision, regional cooperation, and integrated public policies. The energy transition not only represents a technological and environmental challenge, but also a historic opportunity to redefine the role of mining in the development of OLACDE member countries.

# BIBLIOGRAPHY


Agência Nacional de Mineração (ANM). *Anuário Mineral Brasileiro: Principais Substâncias Metálicas – Ano-base 2023*. Brasília: ANM, 2024

National Mining Agency (ANM). *Minería para la Vida – Cartilla Minería 2024*. Bogotá: ANM, 2024.

Banco Mundial. (2020). *Minerals for climate action: The mineral intensity of the clean energy transition*. https://documents.worldbank.org/en/publication/documents-reports/documentdetail/099052423172525564.

Consejo Minero. (2025). *Cifras Actualizadas*. https://consejominero.cl/wp-content/uploads/2026/01/20260107-CAM-diciembre-1.pdf.

IEA. (2025). *Global Critical Minerals Outlook*. https://www.iea.org/reports/global-critical-minerals-outlook-2025.

OLACDE. (2024). *Los Minerales Críticos para la Transición Energética*. https://www.olade.org/publicaciones/estudio-sobre-minerales-criticos-en-la-region/.

National Administration of Power Plants and Electrical Transmissions (UTE).https://www.gub.uy/ministerio-industria-energia-mineria/comunicacion/publicaciones/plan-expansion-generacion-2024-2043

Central Bank of the Argentine Republic (BCRA). (2024). *Proyecciones de la balanza comercial 2024-2030*. Buenos Aires, Argentina. https://www.bcra.gob.ar/archivos/Pdfs/PublicacionesEstadisticas/proyecciones-de-la-balanza-comercial-2024-2030.pdf

National Energy Commission (CNE) of Chile. (2023). *Informe Técnico Preliminar de Previsión de Demanda Eléctrica 2023-2043*. Santiago de Chile, Chile. https://www.cne.cl/wp-content/uploads/2023/12/Informe-Preliminar-Prevision-de-Demanda-Electrica-2023-2043.pdf

National Energy Commission (CNE) of the Dominican Republic. (2022). *Plan Energético Nacional 2022-2036*. Santo Domingo, República Dominicana. https://datacne.gob.do/tablero-dinamico/demanda-electrica-nacional

National Load Dispatch Committee (CNDC). (2024). *Memoria Anual y Resultados del Sistema Interconectado Nacional*. La Paz, Bolivia. https://www.cndc.bo/home/media/memyres_2024.pdf

National Electric Corporation (CORPOELEC). (2025). *Informe de Actualización de Convenios de Cooperación Técnica para la Rehabilitación del SEN*. Caracas, Venezuela.

General Directorate of Energy, Hydrocarbons, and Mines (DGEHM). (2021). *Plan Indicativo de la Expansión de la Generación 2021-2031*. San Salvador, El Salvador. https://estadisticas.dgehm.gob.sv/wp-content/uploads/2021/06/Plan-indicativo-de-la-generaci%C3%B3n-de-la-expansi%C3%B3n-2021-2031.pdf

Energy Research Office (EPE). (2024). *Plano Decenal de Expansão de Energia 2034*. Ministério de Minas e Energia. Brasilia, Brasil. https://www.epe.gov.br/sites-pt/publicacoes-dados-abertos/publicacoes/PublicacoesArquivos/publicacao-804/topico-758/PDE2034_Aprovado.pdf

Electric Transmission Company S.A. (ETESA). (2020). *Plan Indicativo de Generación 2020-2034, Tomo II*. Ciudad de Panamá, Panamá. https://www.etesa.com.pa/documentos/Tomo_II__Plan_Indicativo_de_Generacin_2020__2034-1992306952.pdf

National Electric Energy Company (ENEE). (2025). *Borrador Informe Plan Indicativo de Expansión de la Generación 2026-2035*. Tegucigalpa, Honduras. https://cnd.enee.hn/wp-content/uploads/2025/09/Borrador-Informe-PIEG-2026-2035.pdf

National Electric Transmission Company (ENATREL). (2024). *Plan Indicativo de Expansión de la Generación 2024-2038*. Managua, Nicaragua. https://www.mem.gob.ni/wp-content/uploads/2023/11/Plan_Indicativo_Expansion_Generacion_Electrica_2021-2035-Final.pdf

First Quantum Minerals Ltd. (2025). *NI 43-101 Technical Report: Taca Taca Project, Salta Province, Argentina*. https://www.first-quantum.com/wp-content/uploads/2026/02/Taca-Taca-Project-Technical-Report-2025-FINAL.pdf

Guyana Power & Light Inc. (GPL). (2024). *Development and Expansion Programme 2024–2028*. Georgetown, Guyana. https://gplinc.com/pl/plc/media/DE-Programme_2024-2028-26.02.2024-per-PUC-Clarifications.pdf

Costa Rican Electricity Institute (ICE). (2023). *Plan de Expansión de la Generación 2022-2040*. San José, Costa Rica. https://www.grupoice.com/wps/wcm/connect/20b300e4-c4df-4994-b1b1-372726fa4f3b/PLAN+DE+EXPANSION+DE+LA+GENERACION+ELECTRICA+2024-2040.pdf?MOD=AJPERES&CVID=pFal9fj

Ministério de Minas e Energia. (2026). Minerais críticos do Brasil: Guia para investidores estrangeiros [Critical minerals of Brazil: Guide for foreign investors]. Ministério de Minas e Energia. https://www.gov.br/mme/pt-br/assuntos/secretarias/geologia-mineracao-e-transformacao-mineral/guia-investidor-minerais-criticos/guia-investidor-estrangeiro-em-minerais-criticos/2026/guia-do-investidor-pt-br-final.pdf

Ministry of Energy and Mines (MINEM) of Peru. (2025). *Cartera de Proyectos de Inversión Minera 2025*. Lima, Perú. https://cdn.www.gob.pe/uploads/document/file/8000189/6722917-cpim-2025.pdf?v=1755709882

Ministry of Energy (Belize). (2024). *National Energy Policy and Strategic Demand Projections*. Belmopan, Belize.

Ministry of Science, Energy, Telecommunications and Transport (MSETT). (2024). *National Energy Balance 2024 Update: Audit and Industrial Demand Projections*. Kingston, Jamaica. https://www.mset.gov.jm/wp-content/uploads/2021/07/MSETT-National-Energy-Balance-2024_Update.pdf

National Office of Statistics and Information (ONEI). (2025). *Minería y Energía - AEC 2024*. La Habana, Cuba. https://www.onei.gob.cu/sites/default/files/publicaciones/2025-07/10-mineria-y-energia_aec2024.pdf

Latin American and Caribbean Energy Organization (OLACDE). (2025). *Asistencia Técnica: Informe para el Sector Minero Energético de Ecuador - Hallazgos Técnicos y Consistencia Energética*. Quito, Ecuador.

Secretariat of Energy (SENER) of Mexico. (2024). *Programa de Desarrollo del Sistema Eléctrico Nacional 2024-2038*. Ciudad de México, México. https://www.cenace.gob.mx/Docs/16_MARCOREGULATORIO/Prodecen/20%202024-2038%20Cap%C3%ADtulos%201%20al%206.pdf

Geological and Mining Service (SERGEOMIN) of Bolivia. (2025). *Energías limpias en un contexto de cambio climático*. https://www.sergeomin.gob.bo/index.php/2025/07/14/energias-limpias-en-un-contexto-de-cambio-climatico/

Mining and Energy Planning Unit (UPME). (2024). *Informe de Proyección de Demanda de Energía Eléctrica y Potencia Máxima*. Bogotá, Colombia. https://www1.upme.gov.co/DemandayEficiencia/Documents/Informe_de_proyeccion_de_demanda_de_energia_electrica_y_potencia_maxima_Rev_dic2024.pdf

National Electric Union (UNE) of Cuba. (2026). *Reporte Operativo del Sistema Eléctrico Nacional*. La Habana, Cuba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