

# **CRITICAL AND STRATEGIC MINERALS AT COP30**

Move forward with a policy  
for Brazilians and for the  
global community







“...a healthy ecology is also the result of interaction between human beings and the environment, as occurs in the indigenous cultures and has occurred for centuries in different regions of the earth. Human groupings have often ‘created’ an environment, reshaping it in some way without destroying it or endangering it. The great present day problem is that the technocratic paradigm has destroyed that healthy and harmonious relationship. In any event, the indispensable need to move beyond that paradigm, so damaging and destructive, will not be found in a denial of the human being, but includes the interaction of natural systems ‘with social systems.’”

**Pope Francis, *LAUDATE DEUM***



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## INTRODUCTION

The global energy transition requires more than ambitious political decisions and well-crafted climate targets — it demands a solid and complex material foundation. This foundation includes, among other elements, **critical and strategic minerals (CSMs)** such as lithium, cobalt, nickel, copper, and rare earth elements, which are essential for low-carbon technologies. In the context of COP30, to be held in Belém, in the heart of the Amazon rainforest, Brazil will have the opportunity to play a central role in shaping a global policy on these resources. As a country with vast geological diversity, a relatively cleaner energy matrix, and significant industrialization potential, Brazil can lead a new mineral diplomacy

committed to sustainable development, national sovereignty, and climate justice.

More than ever, Brazil and the world will need to establish a comprehensive overview of the relationship between climate and critical minerals — exploring national commitments (NDCs) to reduce carbon emissions, pathways to climate neutrality, commercial and geopolitical opportunities, and the role of Brazilian industrial supply chains. Governance criteria, circularity, and infrastructure will also be key to ensuring that CSMs contribute to the country's prosperity by reducing inequalities and upholding social, environmental, and territorial rights.

### 1. Climate Crisis and Critical Minerals

The decarbonization of the global economy—essential to addressing the climate crisis—is directly linked to the expansion of new technologies such as wind turbines, solar panels, batteries, electric vehicles, and smarter grids. All of these technologies rely heavily on critical minerals. For example, an electric vehicle may require up to six times more minerals than a conventional car, and a single wind turbine uses more minerals than a natural gas power plant.

Brazil's Ten-Year Energy Expansion Plan (PDE) estimates that, between 2024 and 2034, the use of minerals in the national power matrix will grow by 54%, while installed capacity is expected to increase by 35%. This expansion, to be properly understood and effectively

planned, must be analyzed in light of the country's climate goals and its economic growth trajectory.

Globally, it is estimated that hundreds of billions of dollars in annual investments will be required through 2040 solely to ensure the supply of these minerals and to make the energy transition viable—or at least to avoid approaching or exceeding the +1,5°C<sup>1</sup> warming limit.

In this context, Brazil must position itself not merely as a commodity supplier, but as a key player in global industrial value chains and as a policymaker in governance and traceability for critical and strategic minerals, with global relevance.

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**1** The 1.5°C scenario **refers** to the target established in the **Paris Agreement** to limit global warming to 1.5°C above pre-industrial levels. This threshold is considered a critical tipping point, beyond which the risks of severe climate impacts—such as more intense heatwaves, rising sea levels, and extreme weather events—increase significantly. Achieving this goal requires drastic reductions in greenhouse gas emissions.

## 1.1 The Physical Link of Climate Action

Nationally Determined Contributions (NDCs), which represent countries' voluntary commitments to reduce emissions, materially depend on the availability and accessibility of critical and strategic minerals (CSMs). Brazil, for instance, has updated its NDC with a target to reduce emissions by between 59% and 67% by 2035 compared to 2005 levels. Meeting this target will require strengthening both national and international integrated supply chains for critical minerals, as well as promoting local industrialization associated with these value chains.

Therefore, the relationship between **NDCs and CSMs will be a central topic at COP30**. Countries like Brazil—and international partners—are expected to advocate for a global

pact on traceability and responsible mining, especially in the Amazon. This proposal aims to align NDC implementation with climate justice, ensuring that the energy transition does not replicate past mistakes in which developing countries served only as raw material suppliers, without adding value or protecting their territories.

It is also important to highlight another category of CSMs: those linked to food systems, which are essential for ensuring food security in Brazil and globally. Phosphate and potassium, for example, are key components of fertilizers and contribute to more efficient and productive land use. This, in turn, can reduce pressure on forested areas and help curb deforestation.

## 1.2 Defining the Path to 2050: Roadmaps to Net-Zero Emissions

Beyond its NDC target for 2035, Brazil envisions achieving net-zero greenhouse gas emissions by 2050. This means eliminating its net emissions without compromising the country's economy, industry, or social progress—while considering a trajectory of growing economic activity and, consequently, increasing energy consumption in the coming decades. To succeed, this pathway must be structured around four key pillars:

1. **Low-emission and climate-resilient infrastructure:** with an emphasis on new transmission lines and adaptation to climate variability, including extreme weather events that pose risks to dams and power grids.
2. **Green industrialization:** the development of industrial value chains for lithium batteries, rare earth magnets, and renewable components, leveraging Brazil's clean energy matrix.

3. **Public policy and financing:** prioritizing CSMs in geological mapping, credit lines, innovation, and research, while strengthening the State's role as a guarantor and streamlining environmental licensing processes—without compromising social and environmental safeguards.

4. **Global social and environmental justice:** the adoption of the United Nations' seven principles for the governance of transition minerals.

Building this path requires overcoming major challenges, such as the current concentration of mineral processing in a few countries, dependence on foreign technologies, and poorly managed socio-environmental impacts. It also calls for the engagement of multiple stakeholders—public and private—in a “climate collective effort,” as proposed by Brazil's COP30 presidency: a transition by choice, not by catastrophe.



## **THE SEVEN UN PRINCIPLES FOR JUST ENERGY TRANSITION MINERALS**

### **1. Human Rights at the Core of the Value Chain**

All stages of the mineral value chain must respect and promote human rights, including the rights of workers, local communities, and Indigenous and traditional peoples.

### **2. Environmental and Biodiversity Protection**

The integrity of the planet must be safeguarded by preventing environmental degradation and promoting responsible mining practices that preserve ecosystems.

### **3. Justice and Equity in Value Chains**

Mineral value chains should be structured fairly and equitably, ensuring that benefits are shared inclusively and do not perpetuate local, national, or global inequalities.

### **4. Development through Benefit Sharing and Economic Diversification**

The extraction of critical minerals must contribute to local development by fostering value addition, job creation, and economic diversification in producing territories, regions, and countries.

### **5. Investimentos, finanças e comércio responsáveis e justos**

Os fluxos financeiros e comerciais relacionados aos minerais críticos devem ser conduzidos de forma ética, transparente e alinhada com os princípios de responsabilidade social e ambiental.

### **6. Transparency, Accountability, and Anti-Corruption**

Implementing mechanisms that ensure operational transparency, stakeholder accountability, and corruption prevention across all stages of the value chain is essential.

### **7. Multilateral and International Cooperation**

Coordinated global action is necessary to promote peace, security, and effective governance of mineral resources, ensuring the broad distribution of the benefits of the energy transition.

## 2. Sovereignty and Mineral Security

The global race for critical minerals has introduced a new factor in international geopolitics. With the energy transition, these resources have shifted from being merely industrial commodities to strategic assets—fundamental for the energy, industrial, and technological security of nations. The global production of minerals such as lithium, cobalt, and rare earth elements is even more concentrated than that of oil and gas, both in extraction and processing, increasing the risks of supply chain disruptions.

In this scenario, Brazil holds a unique position. It is one of the world's largest exporters of iron ore, manganese, tantalum, niobium, and bauxite. However, it still depends on imports of processed products, such as aluminum sheets and lithium derivatives. Thus, there is an asymmetry between geological potential and the degree of industrialization—a bottleneck that compromises both mineral security and the country's economic sovereignty.

Mineral security involves stable, predictable, and environmentally responsible access to the inputs necessary for the energy transition. It is a concept that goes beyond sectoral boundaries, affecting foreign policy, national security, and industrial planning. Historically, developing countries have been viewed merely as raw material sources for industrial powers. This logic must be overcome.

Sovereignty over strategic minerals must be exercised through:

- Traceability and public control of the supply chain;
- Technological capacity building and local industrialization;

- Transparent and participatory governance involving local communities;
- Sovereign participation in international agreements.

Brazil can lead a new governance approach alongside other Global South countries, focusing on equality among international partners and more transparent and just social and environmental criteria guiding trade relations. A proposed pact on critical and strategic minerals (CSMs) in the Amazon, involving all countries in the region, would follow this direction, potentially linking the use of strategic mineral resources to carbon credit generation and the protection of sensitive territories.

The seven principles of the UN Panel, as seen above, provide a legitimate foundation for this. They require respect for human rights, biodiversity, equity in value chains, and international cooperation as pillars of new mineral governance.

On the other hand, within this new international landscape, Brazil is highly competitive in three crucial dimensions:

1. **Diverse geological potential:** with significant reserves of niobium, graphite, manganese, bauxite, copper, and rare earth elements.
2. **Low-emission power matrix:** enabling value addition with a smaller carbon footprint.
3. **Sophisticated environmental legislation:** which can be a competitive differential and attract ethical international capital.

This tripod paves the way for strategies such as:

- **Powershoring:** Brazil is among the most promising countries in this regard due to its renewable power matrix, water reserves, and potential for developing new technologies, including green hydrogen.
- **Friendshoring:** The country maintains good diplomatic relations worldwide and can deepen partnerships with OECD, BRICS, and Mercosur countries to form more stable and reliable supply networks.
- **Green certification and branding:** Developing new future markets by exporting products with socio-environmental traceability and claims such as the already known “green steel,” “sustainable Amazon copper,” or “responsible Brazilian lithium,” among others.

The full utilization of critical and strategic minerals in Brazil depends on a robust set of investments and institutional coordination that allows the transformation of mineral potential into added value. This infrastructural framework must align with climate objectives, respect ecological limits, and strengthen the country’s productive capacities—with a focus on logistics, energy, connectivity, and traceability.

South America combines strategic geological resources, unique biodiversity, and major industrial consumers. This combination justifies strengthening regional mineral value chains through Mercosur and other cooperation initiatives, with goals such as:

- Promoting the establishment of processing zones;
- Harmonizing environmental, labor, and technical standards in mining;
- Integrated logistics corridors connecting mines to processing and export centers (sustainable railways, waterways, and ports).

Brazil can become an industrial hub for South America’s energy transition by manufacturing inputs for new technologies using regionally extracted resources, promoting local value creation, and reducing dependence on distant and volatile markets.

However, these opportunities depend on investments in geological research, R&D, and especially in developing mineral processing and transformation capacities domestically, as well as improving logistical infrastructure. Given that supplier diversification can increase production costs, incentive policies, risk reduction measures, and state support in technological development and as a guarantor are necessary.

By following this path, Brazil will evolve from a country with exceptional geological endowment to one with notable mineral vocation. Geological endowment refers to the geological structure of a territory, including the distribution of different types and occurrences of minerals. The quality and quantity of these minerals are crucial factors of geological endowment. Mineral vocation, on the other hand, defines the economic potential and the use a territory can make of its mineral resources.

A territory with good mineral endowment may or may not have a mineral vocation oriented toward mining, metallurgical industry, civil construction, or even the energy transition. Everything depends on the choices that each country must make as a nation and society in the face of today’s challenges, and subsequently on the policies that will accompany those choices.

## THE BRAZILIAN SUSTAINABLE TAXONOMY

Part of the **Ecological Transformation Plan** launched by the Brazilian government, **the Brazilian Sustainable Taxonomy**<sup>22</sup> is a fundamental tool to guide and expand financing for economic activities aligned with environmental, social, and climate objectives. In the mining sector, especially regarding critical minerals, its relevance is undeniable because it:

- Defines clear sustainability criteria.
- Attracts green capital: by classifying certain mining projects as sustainable, it makes them eligible for green bonds, sustainability-linked loans, and investment funds with ESG criteria.
- Reduces perceived investor risk by providing greater transparency on project sustainability, which may lead to more favorable credit conditions.

The taxonomy acts as a regulated “sustainability seal” — projects that comply with its criteria can be officially recognized as sustainable. This allows public banks (such as BNDES), multilateral institutions, and private funds to channel resources directly to these enterprises. It also facilitates the standardization of sustainability reporting, promoting greater comparability and credibility in environmental and social practices.

On the other hand, the Brazilian Sustainable Taxonomy, inspired by models such as the European Union taxonomy, requires projects to:

- Make a significant contribution to at least one environmental objective (climate change mitigation, sustainable water use, circular economy, etc.).
- Not cause significant harm to any other environmental objective (the “do no significant harm” principle).
- Comply with minimum social safeguards, such as respecting labor rights and protecting local communities and Indigenous peoples.
- Ensure transparency and traceability in processes, with measurable sustainability indicators.
- Guarantee effective consultation and social participation during planning and licensing phases.

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**2** To learn more about the Brazilian Sustainable Taxonomy, visit: <https://www.gov.br/fazenda/pt-br/orgaos/spe/taxonomia-sustentavel-brasileira>

### 3. A “Brazilian Model” for the Exploration and Use of CSMs

Thus, Brazil’s mineral vocation must be founded not only on the production of critical minerals favored by its mineral endowment. In light of the new geopolitics of minerals and the urgent need for a just transition, the country must consolidate its own model of exploration and industrialization of CSMs—a “Brazilian model” that combines **industrial competitiveness, social inclusion, territorial sovereignty, and environmental sustainability**.

This vision aligns with the country’s potential to lead strategic production chains by leveraging its clean power matrix, existing infrastructure, and growing international pressure for traceability, circularity, and democratic governance in mining.

To advance value addition in the CSM production chain, the following should be implemented:

- Incentives for mineral processing within national territory;
- Technology parks focused on green manufacturing (such as efficient batteries and energy converters based on alternative energy);
- Regional integration of supply chains with Mercosur and Global South countries;
- Strengthening applied research institutes and technical workforce training.

The powershoring and friendshoring factors described above can consolidate Brazil as a reliable supplier of low-carbon inputs with high environmental control. This requires legal predictability, agility in licensing processes, and financial support for research and innovation.

On the other hand, in the exploration of CSMs—as in all mining activities—the Financial Compensation for Mineral Exploration (CFEM) is a central tool to balance mineral wealth with social well-being. However, its implementation needs improvement to ensure that collected resources truly return to communities affected by mining.

It is essential to increase transparency in the allocation and use of CFEM funds; create participatory local councils; and integrate CFEM resources into territorial policies on infrastructure, education, and economic diversification.

Democratic governance of CSMs must be multi-scalar: local, national, and international. This governance must be based on sustainability and equity—environmental, social, economic, and intergenerational. Without this, the energy transition risks becoming a new extractive cycle with a “green” face but negative impacts, deepening socio-economic contradictions and inequalities in Brazil and worldwide.

#### 3.1 Amazon, Traceability, and Decarbonization

The Amazon holds not only biodiversity and ecosystem services but also significant reserves of bauxite, manganese, copper, gold, and rare

earth elements. However, it is also one of the regions most vulnerable to poorly regulated mining and illegal exploitation.

To make the Amazon a global example of responsible mining, coordinated actions among government, private sector, civil society, and local communities are necessary to:

- Integrate legal mining activities into **sustainable territorial development plans**, focusing on education, health, connectivity, and participatory governance;
- **Condition licenses on the adoption of low-impact technologies**, including efficient water use and renewable energy;
- **Implement reserves and exclusion zones for mining activities**, taking into account environmental, cultural, and other sectoral interests of a more diversified and sustainable economy (with bioeconomy development as a strategic sector for the country).

Brazil's proposal for COP30 may include the creation of a **CSM traceability pact in the Amazon**, ensuring that inputs extracted from the region comply with strict socio-environmental responsibility criteria. Starting with the Amazon biome and focusing on CSMs, traceability can gradually become a standard for all Brazilian mineral resources and across all biomes.

Traceability of CSMs will be a regulatory and market requirement in the coming years. The Critical Raw Materials Act, approved by the European Union in 2023, mandates that mineral supply chains be auditable from origin to final destination. In this context, Brazil must build a **robust digital infrastructure** to:

- Monitor the origin, transport, and transformation of minerals;
- Verify compliance with social, environmental, and fiscal criteria;

- Prevent the entry of illegal or conflict minerals into the formal market.

This involves integrated databases among ANM (National Mining Agency), Ibama (Brazilian Institute of Environment and Renewable Natural Resources), Federal Revenue Service, municipalities, and companies; as well as public platforms providing **access to information** for investors, consumers, and local communities.

With this, Brazil can consolidate a **global brand of mineral reliability**, transforming traceability into a competitive, reputational, and diplomatic advantage.

Finally, Brazil's mining logistics matrix still heavily depends on road transport, which is polluting and costly. Decarbonizing CSM transport is a key challenge to ensuring competitiveness and environmental legitimacy of products and is under development and progress.

Therefore, it is necessary to:

- Expand the use of biofuels and electrification in freight transport;
- Implement low-carbon emission rail and waterway infrastructure;
- Promote "green logistics zones" with controlled carbon emissions and real-time tracking of the carbon footprint of mineral inputs.

These measures increase climate resilience and qualify Brazilian products for more demanding markets, such as the European Union, which already adopts "carbon footprint" criteria for strategic imports. Many companies operating in Brazil are strongly committed to the decarbonization process—not only of logistics but also of the entire mineral processing chain.

## 4. The Role of the Mineral Sector in Climate Adaptation

Although more frequently associated with emissions mitigation through supplying inputs for clean energy technologies, the mineral sector also plays a critical role in **adapting to climate change**. Mining operations are particularly vulnerable to extreme events such as prolonged droughts, heavy rainfall, water scarcity, and soil degradation—all phenomena expected to intensify in the coming decades. Adaptation in the mineral sector involves both **protecting its own assets** and committing to the **resilience of the territories where it operates**.

The climate impacts on mining cannot be underestimated. Key risks include:

- Increased flooding, with risks of contamination to ecosystems and populations;
- Water conflicts in areas with multiple uses and growing scarcity;
- Production disruptions due to energy shortages or logistical damages;
- Increased conflicts and intensified disputes with local communities.

These risks require sectoral adaptation plans with clear targets and continuous monitoring, as well as investments in: robust and flexible physical infrastructure; early warning and rapid response systems for climate events; professional requalification for emergency scenarios and new environmental competencies; partnerships with local governments for containment measures, ecosystem restoration, and shared water management.

Beyond limiting climate risks to its operations, the sector can be an important factor in the climate adaptation of the territories where it is present. This contribution from mining can be structured around four main fronts:

1. **Regenerative actions:** applying technologies that restore degraded landscapes, control erosion, and promote water resilience, such as water retention systems and reforestation with native species.
2. **Shared green infrastructure:** supporting the construction of multi-use works—roads, bridges, transmission lines, and reservoirs—that serve both mining activities and local population needs.
3. **Blended climate financing:** encouraging mechanisms to channel part of mineral royalties and other resources, fees, or taxes, whether voluntary or mandatory, linked to mining activities, towards adaptation and resilience works in affected areas.
4. **Climate education and community engagement:** empowering local populations to manage climate risks and actively participate in the governance of mined territories.

Through these actions, the mineral sector can become a strategic partner for resilience and territorial adaptation, benefiting directly by limiting risks and creating value, but also as a leading actor in public interest initiatives.

## CONCLUSION

The ongoing global energy transition opens a historic window of opportunity for Brazil—particularly due to the strategic role of Critical and Strategic Minerals (CSMs), which are abundant in the country. More broadly, Brazil brings together:

- Strategic geological resources;
- A clean electricity matrix;
- Functioning democratic institutions;
- Growing environmental credibility on the international stage

COP30 will be the stage to consolidate this new role. Brazil can position itself as a **global leader in a just and sustainable energy transition**, by shaping rules, building coalitions, and promoting exemplary practices within its territory. To achieve this, it will be necessary to mobilize diplomacy, the private sector, and civil society around five key commitments:

- **Align Nationally Determined Contributions (NDCs)** with mineral security, through sustainable value chains and local industrialization;
- **Strengthen democratic governance of mining**, ensuring rights and promoting traceability;
- **Invest in infrastructure and innovation**, with a focus on circularity, transformation, and value addition;
- **Assume a leadership role** in the geopolitics of minerals, forging South-South alliances and multilateral frameworks;
- **Contribute to climate adaptation in mining territories**, with social justice and long-term vision.

The transition will come—by choice or by catastrophe. Brazil has the opportunity to be a protagonist, not merely as a supplier of inputs or a key player in a global industrial chain, **but as a shaper of the future**. To do so, it must commit to strategic vision, long-term pacts, and coordinated action—**starting now**.

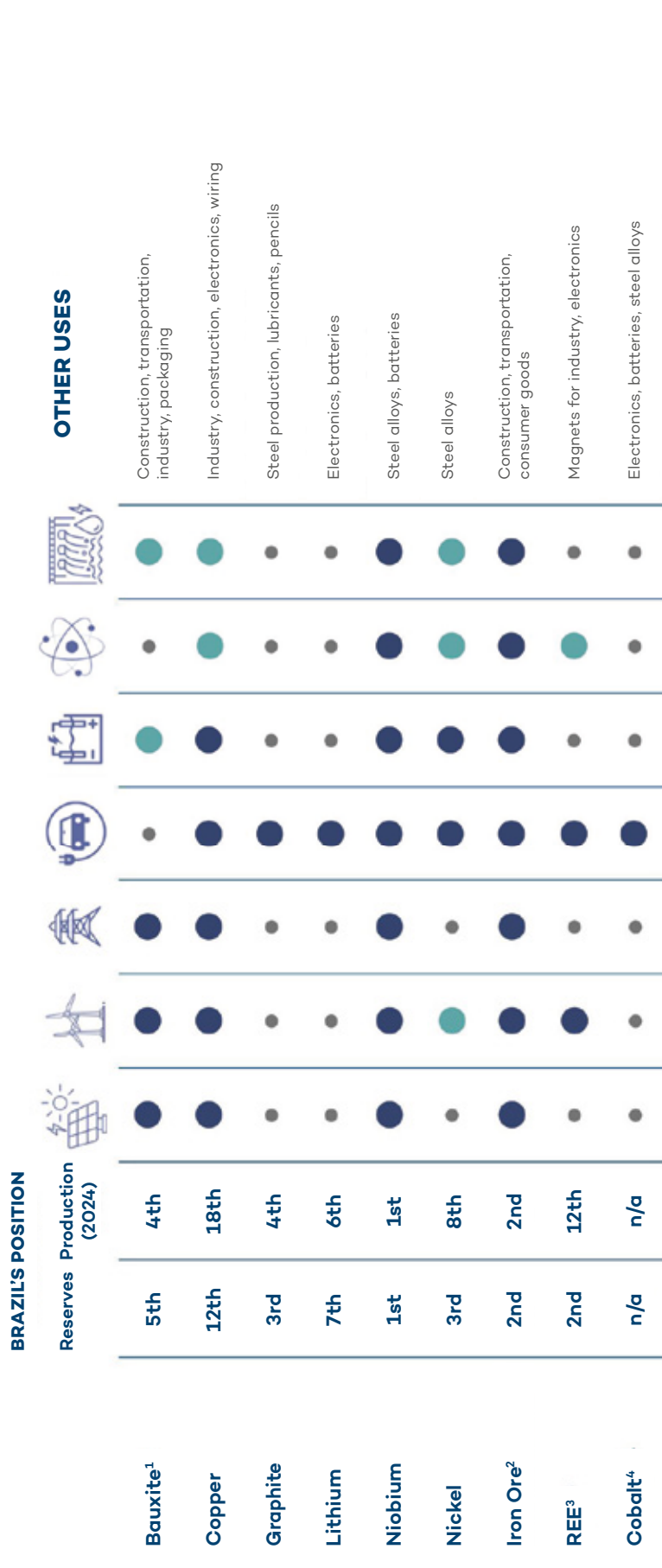
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# Annex

## Use and Importance of Critical and Strategic Minerals and the Position of Their Production in Brazil

### Critical and Strategic Minerals



Importance of the Material for Clean Energy Technologies:

- High
- Medium
- Currently little or no demand

<sup>1</sup>Aluminum

<sup>2</sup>Steel

<sup>3</sup>Magnetic REEs (Nd, Pr, Dy, Tb)

<sup>4</sup>Recovery potential (anthropogenic stock)

**Our thanks to the experts and leaders who  
agreed to participate, donating their time  
and sharing knowledge and experience.**



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