Strategic minerals and the energy transition

*How will Brazil deal with production?*

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Introduction

Despite the absence of a clear policy on strategic or critical minerals, Brazil has committed R$54.3 million from this year’s Federal Budget to improve geological mapping, aiming to identify potential reserves crucial for the energy transition. These efforts focus on minerals essential for electric vehicle batteries and renewable energy production, such as wind and solar.

The budget for these geological studies is threefold the initial proposal, demonstrating significant political backing for this initiative. In early March, the National Bank for Economic and Social Development (BNDES) introduced a fund up to R$1 billion, partially funded by the bank itself, to support the exploration of these critical minerals.

This strategic pivot towards mineral exploitation is central to Brazil’s role in the energy transition and forms a key component of its emerging industrial policy, which awaits further elaboration.

In August 2023, the new Growth Acceleration Programme (PAC) outlined public investments of approximately R$281 million by 2026 in mineral research dedicated to the energy transition, extending to maritime exploration.

Moreover, the introduction of a clean energy mining program, as mentioned by Mines and Energy Minister Alexandre Silveira in February, aims to set "clear guidelines" for boosting the production of key minerals like lithium, rare earths, niobium, and copper. This initiative not only seeks to increase mineral production but also endeavors to establish a complete battery production chain within Brazil, particularly for lithium.

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1 A new budget programme, entitled Safe and Sustainable Mining, has a total of R$139.8 million. In addition to geological studies, there are plans to increase research and mining grants from the National Mining Agency. The allocation of money is an important part of the 2024 climate budget. (https://institutotalanoa.org/wp-content/uploads/2024/02/Orcamento-Climatico-2024-Instituto-Talanoa.pdf)

Revamping Mineral Policy

Since 2023, Brazil's Ministry of Mines and Energy (MME) has highlighted the nation's significant potential in critical and strategic minerals essential for the energy transition\(^3\). A presidential decree from 2021 aimed to streamline the process for initiating new mineral explorations by simplifying environmental licensing and project processing\(^4\). The Pro-Strategic Minerals policy, established by this decree, continues under President Lula's administration, facilitating projects like the Canadian company BeloSun's gold ore exploration near Belo Monte and the Paquiçamba\(^5\) Indigenous Land in Pará.

Environmental licensing emerges as a critical concern, particularly as mineral extraction extends into protected Amazonian territories and marine areas. State governments largely oversee the licensing process, exemplified by lithium projects in Minas Gerais' Jequitinhonha Valley, positioning it as a calling card for Brazil's strategic mineral production.

In September 2023, Canada's Sigma Lithium marked a milestone by exporting the first batch of "green" lithium to a Chinese electric car battery manufacturer, propelling Brazil into the forefront of global lithium production. This initiative received a significant boost from a decree by former President Jair Bolsonaro in July 2022\(^6\), which is also in force, and has faced scrutiny over conflicts with indigenous lands and environmental repercussions\(^7\).

Also during the previous government, the MME discussed a new national mining plan for the period up to 2050, which was the subject of a public consultation. This plan has not yet superseded the one launched in 2011,
which made no mention of the energy transition. But the document is cited here because it highlights risks and gaps in a policy for critical minerals:

- The lack of geological knowledge, which makes Brazil's estimated potential inaccurate: "In the evaluation of the execution of the geological mapping of Brazil over three mapping cycles (1969-1993, 1994-2002, 2003-2021), it is observed that, although great effort has been undertaken by the Geological Survey of Brazil (SGB-Companhia de Pesquisa de Recursos Minerais/CPRM) and by state governments, such as Minas Gerais, Bahia and Paraná, the country is still at a deficient stage of geological knowledge, with only 48% of its territory mapped at a scale of 1:250,000 scale and 27 per cent on the 1:100,000 scale";

- Part of the mineral potential is found in the Amazon, in the preserved and protected part of the forest and in indigenous lands: "Around 63 per cent of the non-Amazon territory is mapped on a scale of 1:250,000 and 55 per cent on a scale of 1:100,000. In the Amazon, only 37 per cent and 8 per cent is mapped on the 1:250,000 and 1:100,000 scales, respectively, and the least known sectors represent the most pristine areas, with preserved biomes, which generally include indigenous lands and border and/or environmental protection areas."

- The advance of mineral exploration in the ocean: "Even considering the size of the Brazilian Legal Continental Shelf, knowledge is relatively behind other nations. Although mineral research at sea is still characterized as strategic, especially in deeper waters, it is important to address the demands for mineral substances that are increasingly scarce on the continent, which could be supplied by marine mineral resources."

A document released in 2023 on Brazil's potential in strategic minerals (An Overview of Critical Minerals Potential of Brazil) is part of the policy of stimulating private investment that came from the previous government. The

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list of minerals with high potential begins with copper, which is found in the Amazon:

COPPER

GEOLOGICAL SURVEY OF BRAZIL
COPPER PROJECTS
Ongoing and planned
1. Guiana Shield
2. Alto Tapajós Basin
3. Southeast of the Amazon Craton
4. Carajás
5. Araguaia Belt
6. Mara Rosa Arc
7. Martinópole and Jaíbaras
8. Curaçá Valley
9. Ribeira Valley
10. Sul-Riograndense Shield

Deposits*
(A)-GT-46/Igarapé Cinzento; (B)-Salobo; (C)-Antas Norte e Sul;
(D)-Serra Verde; (E)-Pedra Branca; (F)-Caraíba; (G)-Chapada;
(H)-Cabaçal; (I)-Bom Jardim; (J)-Minas de Camaquã

* Copper occurrences

Source: Serviço Geológico Brasileiro. An overview of critical minerals potential of Brazil, 2023
Brazil's role in the clean energy game

If on the one hand there are still doubts about the potential of strategic minerals in Brazil and the viability of "sustainable" exploitation of these resources, on the other hand it is clear that strategic minerals are needed for clean energy generation.

This is because the energy transition to low carbon emissions requires so-called strategic or critical minerals, present in solar panels, wind turbines and electric cars, as shown in a study by the International Energy Agency (IEA). In the IEA document, Brazil does not appear as a major producer of critical minerals, only of graphite, behind Mozambique, although Brazil is already known for its niobium exploration (authorisations exploded under the Bolsonaro government, precisely in the Amazon). The country is highlighted in the extensive report for the environmental disasters of the Brumadinho (2019) and Mariana (2015) dam collapses.

A 2023 document by the International Renewable Energy Agency (Irena) on the geopolitics of the energy transition shows Brazil with potential for mining lithium, nickel, manganese and neodymium, as well as graphite.

Both agencies emphasize the growing demand for minerals for the energy transition, in the scenarios of reducing emissions caused by burning fossil fuels, as shown in the graph on the following page.

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The energy transition will be mineral-intensive, the two international agencies highlight. The demand for minerals in the generation of clean energy and low-carbon transport is much greater when replacing fossil energy sources.

The rapid deployment of clean energy technologies as part of energy transitions implies a significant increase in demand for minerals.

Source: IEA, The role of critical minerals in clean energy transition, 2021

Fonte: IEA, The role of critical minerals in clean energy transition, 2021
The limits of sector policy in Brazil

Before the Lula administration, the Bolsonaro government had already tried to stimulate the exploitation of strategic minerals, although not exactly focussed on the energy transition. A 2021 MME resolution, which lists strategic minerals, mixes inputs for agriculture and the energy transition (table below). It's a Brazilian salad, mixing the interests of the mineral sector and agribusiness, justified in part by the repercussions of Russia’s invasion of Ukraine and Brazil’s dependence on fertiliser inputs. Minerals are classified according to their external dependence, their importance in high-tech processes or their competitive advantages.

A study by the Institute for Applied Economic Research (Ipea) on strategic minerals\(^\text{12}\) noted that under the Bolsonaro government, decree 10,657 created the Pro-Strategic Minerals Policy and tried to facilitate the opening of new mineral exploration areas. Following this, two resolutions were issued, setting up the Interministerial Committee for Analysing Strategic Minerals Projects (CTAPME) and defining the list of strategic minerals for Brazil (table below). A report by the committee was published last year\(^\text{13}\).

The three categories of strategic minerals for Brazil

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<th>Mineral resources that Brazil depends on to supply vital economic sectors</th>
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<td>Sulphur</td>
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<th>Mineral resources that are important for their application in high-tech products and processes</th>
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<td>Cobalt</td>
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<td>Platinum group metals</td>
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<td>Silicon</td>
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<td>Titanium</td>
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<th>Mineral resources that Brazil has competitive advantages and which are essential for the economy</th>
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<tr>
<td>Aluminium</td>
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<td>Gold</td>
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Source: Resolution 2, 2021

\(^\text{12}\) Ipea. Texto para discussão 2768. MINERAIS ESTRATÉGICOS E CRÍTICOS: UMA VISÃO INTERNACIONAL E DA POLÍTICA MINERAL BRASILEIRA, 2022

An analysis of the *Política por Inteiro*\(^\text{14}\) highlighted the lack of transparency in the policy, aggravated by the lack of a representative from the environmental area on the inter-ministerial committee created at the time: “The *Pro-Strategic Minerals Policy* was formulated to enable the ‘development’ of the country without making the proper connections and synergies between the agendas involved in the issue” (such as the lack of inclusion of environmental entities in governance).

In this context, and also by decree\(^\text{15}\), the Bolsonaro government instituted the Brazilian Mineral Policy in 2022 and created the National Mineral Policy Council. The composition of the council was changed in 2023, basically to include ministries created during the Lula administration, such as that of Indigenous Peoples. The council did not meet until February 2024.

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**Recommendations**

Brazil has a non-transparent policy for stimulating strategic minerals, instituted by decree under the Bolsonaro government and without formal review by the Lula government. This policy does not address the challenges of safely exploiting critical minerals available on Brazilian territory that would be indispensable to the energy transition.

The country’s greater relevance in this supply chain depends not only on advances in geological research, but also on a more in-depth debate on the environmental and social impacts of mineral exploration that helps reduce carbon emissions. Impacts on biodiversity, the fate of tailings, social inequality and geopolitical aspects must be considered, since Latin American countries such as Chile, Peru, Bolivia and Argentina are already among the major producers.

There is also an important focus for discussion in the Amazon, not least because part of the estimated mineral potential is found in areas of forest that are still preserved and even protected.