



FOR A CRITICAL AND STRATEGIC MINERALS POLICY FOR BRAZIL AND THE FUTURE

*Fundamentals and
guidelines*





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Fundamentals and guidelines

Brazilian Mining Institute - IBRAM

MAY | 2024

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ACRONYMS AND DEFINITIONS



APLs - Arranjos Produtivos Locais

AMIG - Associação Municípios Mineradores de Minas Gerais e do Brasil

ANM - Agência Nacional de Mineração

BNDES - Banco Nacional de Desenvolvimento Econômico e Social

CETEM - Centro de Tecnologia Mineral

CNPM - Conselho Nacional de Política Mineral

DNPM - Departamento Nacional de Produção Mineral, hoje ANM

EMBRAPII - Empresa Brasileira de Pesquisa e Inovação Industrial

ESG (inglês) / ASG (português) - Environmental, Social and Governance / Ambiental, Social e Governança

FINEP - Financiadora de Estudos e Projetos

FNDCT - Fundo Nacional de Desenvolvimento Científico e Tecnológico

GEE - Gases de Efeito Estufa

IBAMA - Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis

IBRAM - Instituto Brasileiro de Mineração

MCE - Minerais Críticos e Estratégicos

MDIC - Ministério do Desenvolvimento, Indústria, Comércio e Serviços

MEMEPP - Ministério do Empreendedorismo, da Microempresa e da Empresa de Pequeno Porte

MCTI - Ministério da Ciência, Tecnologia e InovActions

MME - Ministério de Minas e Energia

MMAMC - Ministério do Meio Ambiente e Mudança do Clima

MS - Ministério da Saúde

MRE - Ministério das RelActions Exteriores

PNMCE - Política Nacional de Minerais Críticos e Estratégicos

PNRS - Política Nacional de Resíduos Sólidos

PMEs - Pequenas e médias empresas

PD&I - Pesquisa, Desenvolvimento e Inovação

PDLM - Programa de Desenvolvimento Local na Mineração

SEBRAE - Serviço Brasileiro de Apoio às Micro e Pequenas Empresas

SGB - Serviço Geológico Brasileiro

TCM - Tribunal de Contas dos Municípios

C&T - Ciência e Tecnologia

ICTs - Instituto de Ciência e Tecnologia

PRESENTATION

From Words to Action

After fostering and actively participating in numerous high-level discussions with the various organized sectors of society, the mining industry has taken the initiative to propose directions for Brazil to strengthen its agenda focused on sustainable development, the promotion of social well-being and the sharing of benefits.

The future of the country, of Brazilians and of the other inhabitants of the planet, as well as of the planet itself, is at stake. In this sense, mineral production becomes more important to establish a condition of 'mineral security' and, I dare say, of national sovereignty from the moment we can affirm that we have secured a sufficient supply of minerals to develop technology and equipment aimed at mitigating the climate emergency and its harmful effects on our quality of life and life expectancy.

The discussions that took place led to a fruitful outcome, represented by this document, prepared under the leadership of the Brazilian Mining Institute (IBRAM) during our administration. It contains proposals for guidelines so that the Brazilian State – regardless of who is in power – can more quickly structure a policy dedicated to the production of critical and strategic minerals on a large scale, with a view to the present and, especially, the future. As I have described, these are traditional minerals, such as iron and copper, but also others that are or should be included in the national production agenda with greater expression, such as lithium, cobalt, rare earths, vanadium, among others.

However, there are also minerals that represent an opportunity to overcome vulnerabilities, including those to which Brazilian agribusiness is subject. Like mining, agriculture is responsible for a large part of the country's foreign exchange generation. This sector, however, is extremely dependent on the import of potassium

and phosphate, minerals used to manufacture fertilizers. The same is true of other important sectors in the country. Developing this production within the country is possible and absolutely strategic, as is the case for minerals destined for decarbonization and the transition to a green economy.

This state action will, in practice, provide a contribution to the re-industrialization of the country. This is because, in addition to the expansion of the mineral sector, other industries will be able to set up based on the greater supply of minerals. Brazil will gain strength in the context of international relations by establishing itself as one of the leaders in the supply of critical and strategic minerals. Therefore, it will attract large volumes of financial resources for investment in its territory and, with adequate governance, will transform this opportunity into benefits for the promotion of socioeconomic and environmental development.

To respond to this increase in mineral production – which is a global demand – the Brazilian mining industry has worked hard over the years, with special dedication to safety, responsibility towards people and the environment. The industry has also added actions to its routine, such as promoting the circular economy as a possible source of materials to meet the high demand, in line with the new global socio-environmental paradigm of more efficient consumption and production. This trajectory has allowed, especially in recent years, to establish a relationship of growing trust with society. And, at that time, the agenda for promoting critical and strategic minerals aligned with the solution to humanity's most serious concern – the climate emergency – clearly establishes the strategic vision that should be taken on by this industrial sector. In fact, our mining sector is gaining a new level of relevance in our daily lives and in the future.

By presenting this proposal for formulating a Public Policy, which aims, above all, at the well-being of people and the country, now and in the future, the mining industry presents an example of how its corporate and institutional stance has changed in recent years. United around IBRAM, we are a group of companies seriously committed to good ESG

practices; one of the three most important sectors for the economy; we foster, with raw materials, the entire industrial park of the country. In view of this reality, the mining industry has an obligation to make itself available to be part of the initiatives aimed at the sustainable future of our nation.

Once committed to the evolution of its operational processes, its relationship with people, and its more incisive insertion in the country's destiny, the mining industry sees that it will advance, including in achieving such a desired achievement.

The set of foundations and guidelines proposed here is the result of hard and dedicated work carried out jointly by the teams at IBRAM, the Mineral Technology Center (CETEM/MCTI), and Humana Sustainability Services, to whom I convey and hereby record due tributes for the high quality of the product delivered.

Raul Jungmann

Chief Executive Officer
Brazilian Mining Institute (IBRAM)

INTRODUCTION

Rich in minerals for the energy transition and with a predominantly clean electricity matrix, Brazil can be both an important provider of commodities and industrial solutions for the decarbonization of the global economy. The country must take advantage of these structural advantages to focus on its own development, building a fairer and less unequal country in a more sustainable world. To this end, it is necessary to establish a National Policy for Critical and Strategic Minerals (PNMCE) that systematically guides the place and path of the mineral sector in a broad, fair, responsible and ambitious ecological transformation.

The methodology of this work is part of a collective construction process based on research and science, through a partnership with researchers from the Mineral Technology Center/MCTI and Humana Serviços em Sustentabilidade. The complete work included the following phases:

- i. Diagnosis and critical analysis of the current agenda for Critical and Strategic Minerals (MCE) in Brazil;
- ii. Benchmark of MCE-producing countries;
- iii. Recommendation of fundamentals for the development of national public policy on MCE; and
- iv. Technological roadmap of MCE in Brazil.

The complete technical study, with national and international data and information on critical and strategic minerals, industrial chains, technological routes and a comparison with the legislation of other countries, can be accessed in the publication **“Fundamentals for Public Policies on Critical and Strategic Minerals for Brazil”**, available on the IBRAM website. (www.ibram.org.br)

In this collaborative construction process, IBRAM also held the International **Seminar on Critical and Strategic Minerals**, in Brasília on May 7 and 8, 2024, when it presented a proposed thematic agenda and discussed it in panels with experts, and then launched its sectoral positioning, called the Green Paper. The positioning presents

the eight axes that suggest to the government and decision-makers paths towards a National Policy on Critical and Strategic Minerals.

This document herein, **“For a Policy on Critical and Strategic Minerals for Brazil and the Future”** presents a proposal for the foundations and guidelines for the construction of this PNMCE. In its second part, it indicates sub-legal measures that can be taken immediately, for the benefit of economic activity and the public interest. The process of discussion and possible processing of a future Bill for the establishment of PNMCE is still open.





JUSTIFICATION

Today, the greatest and most immediate threat to the future of humanity is, without a doubt, the climate crisis, which affects populations and economies all over the world. In order to fight climate change, the Paris Agreement established targets for reducing greenhouse gas emissions, requiring all countries to engage in a process of decarbonizing their economies, including a process of changing the energy matrix. The urgency of decarbonizing the entire economy is a global consensus.

Climate, decarbonization, energy and mining are elements of the same equation. Tackling the climate emergency and seeking to comply with the Paris Agreement involve, among other things, expanding the extraction and use of mineral resources.

Mining institutions and professionals have highlighted the importance of the sector in achieving the established global goals. There are mainly three dimensions of the energy transition process in which the use of mineral resources plays a preponderant role: the production of energy from renewable sources; the structures for transporting, storing and distributing energy; and the replacement of infrastructure, equipment and vehicles that currently run on fossil fuels with electrical systems or alternative fuels.

The demands are very diverse: more copper will be needed for the construction of wind farms and the transmission of electricity; more silicon for the generation of photovoltaic energy; nickel, lithium and graphite will be increasingly demanded for the production of batteries; a greater quantity of rare earths will be needed for the production of electric motors; and in addition to the minerals considered critical, metals such as aluminum and iron will see their demand multiply due to the process of replacing vehicles and equipment.

According to the International Energy Agency, even if steel and aluminum are excluded, estimates regarding the demand for mineral inputs for the energy transition, in the most favorable decarbonization scenario, would be 4 to 6 times the 2020 production

volumes, respectively, in 2040 and 2050. Even considering slower decarbonization, demand in 2040 is estimated to be twice as high as in 2020.

Figure 1 - Quantity of critical and strategic materials by country



Country	PER	BOL	CGO	MAS	NGR	NOR	ARG	RSA	FIN	UK	CHI	BRA	COL	AUS	ESP	CAN	JPA	KOR	IND	EU	USA
Materials/minerals listing	1	2	3	5	7	8	14	14	17	19	20	22	25	26	30	31	34	34	44	50	50

Prepared by CETEM 2024

Brazil has territorial characteristics that favor the development and diversification of an energy matrix that is already largely based on renewable energy, and a geological potential that is still far from being fully mapped, which presents undeniable riches. In addition to the minerals related to the energy transition, in a country where the agricultural sector has a preponderant weight in the trade balance and in the economy as a whole, it is also necessary to look at mineral goods related to the fertilizer and remineralizer chain, the agrominerals, and assess their degree of criticality, because in

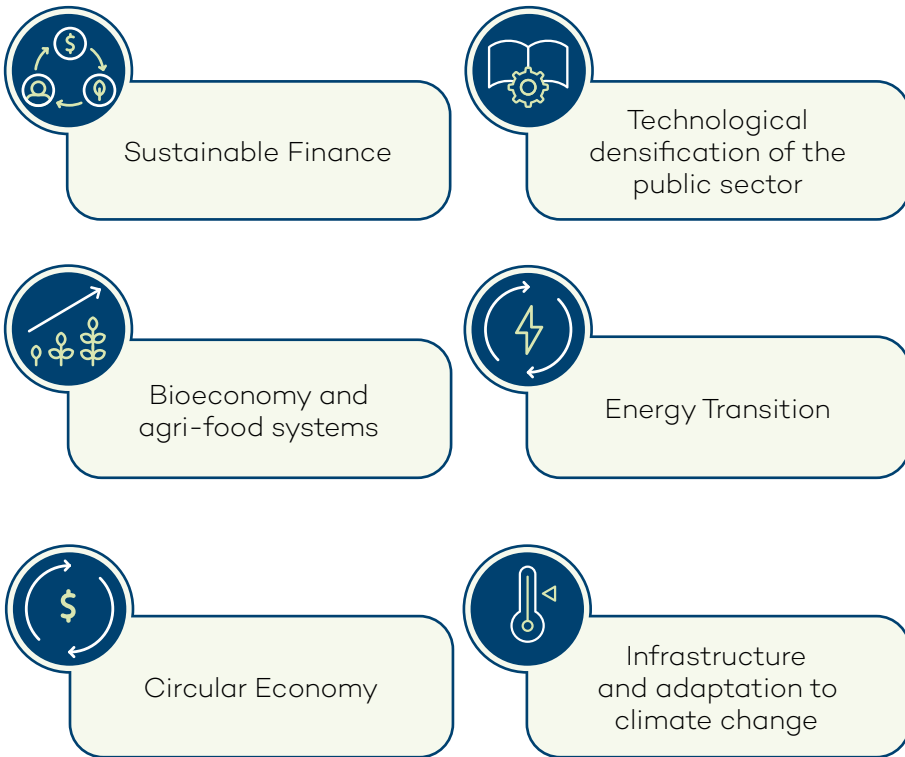
relation to these, even though we have reserves, we note a strong dependence on imports.

The Brazilian government, on the occasion of its presidency of the G20, defended what would be the great challenge of our time: “Building a Just World and a Sustainable Planet”, that is, promoting more equitable and sustainable socioeconomic development that ends hunger and poverty in the world, while decarbonizing the global economy and tackling the climate emergency. However, the country itself still lacks a single and integrated framework for policies specifically aimed at Critical and Strategic Minerals, as other countries have done.

At the government level, the Ministry of Finance (MF) released its Ecological Transformation Plan, with measures aimed at regulating the mineral sector, especially critical and strategic minerals. The Ministry of Mines and Energy (MME) also announced a plan to streamline the production of critical minerals and strengthen the entire chain, from geological knowledge to the development of mineral transformation. It is also worth highlighting the Ministry of Environment and Climate Change (MMAMC), which has taken a position in relation to projects and policies with high environmental-climate impact, and the necessary involvement of state environmental departments, which are largely responsible for the environmental licensing of projects.

Another very important government initiative within the scope of the Ministry of Industrial Development and Commerce, the New Industry Brazil plan, points to an industrialization process strongly based on the use of MCE and prioritizes several chains associated with them, as a way to develop a more sustainable industry. By way of example, the plan foresees, among its missions, more sustainable mobility, a sustainable agroindustry and also a mission entirely focused on “Bioeconomy, decarbonization, and energy transition and security”. In terms of financing, the “Greener Industry” axis establishes the creation of a Critical Minerals Fund.

AXES OF THE MINISTRY OF FINANCE'S ECOLOGICAL TRANSFORMATION PLAN



However, for Brazil to find its destiny as a “green power” amid the global transition, a National Policy for Critical and Strategic Minerals, which integrates sectoral policies and the various federative spheres, is more than necessary, including to provide security to commercial partners and investors. Therefore, it is extremely important that PNMCE be linked to plans and programs such as the Ecological Transformation Plan, the New Industry Brazil Plan, the Climate Plan and other legal and regulatory frameworks, promoting inter-ministerial integration on a topic that affects the entire new global economic matrix, which emerges with decarbonization.

THE SIX MISSIONS OF THE NEW INDUSTRY BRAZIL PLAN



Mission 1

Sustainable and digital agroindustrial chains for food, nutritional and energy security



Mission 2

Resilient health-industrial economic complex to reduce SUS vulnerabilities and expand access to health



Mission 3

Sustainable infrastructure, sanitation, housing and mobility for productive integration and well-being in cities



Mission 4

Digital transformation of industry to increase productivity



Mission 5

Bioeconomy, decarbonization and energy transition and security to guarantee resources for future generations



Mission 6

Technologies of interest to national sovereignty and defense

We must consider, in the context of Brazilian territorial inequalities and contradictions, the presence of mining in an integrated and cumulative manner. In addition to the historical challenges of promoting local development in the context of large-scale projects, there are also new global regulatory frameworks, making public policies for inclusion and the promotion of social development an absolute requirement for the international market.

The guarantees that each country will give to the world regarding the conditions for exploiting mineral resources will be a major competitive advantage: environmentally, demonstrating responsibility and

rigor in reducing impacts, but also in tackling poverty in the vicinity of the project, promoting local development and avoiding violations of human rights.

A set of measures and policies can and should be established to monitor projects in the mineral sector, which should be implemented jointly by companies and the public sector, through partnerships, and focusing on:

1. Territorial development agendas
2. Strengthening institutional capacities
3. Financial mechanisms and incentives

The State, companies and financiers must, together, seriously address the challenges of the socio-environmental and governance agenda and build a new paradigm. This must be within the scope of an ambitious and fair mineral policy, aiming at a more sustainable and less unequal future for the whole of society.



FUNDAMENTALS
AND GUIDELINES
FOR THE NATIONAL
POLICY ON
CRITICAL AND
STRATEGIC
MINERALS

The fundamentals and guidelines for the development of a National Policy for Critical and Strategic Minerals (PNMCE) can be systematized into eight axes.

- **Definition of Critical and Strategic Minerals (MCE in Portuguese, CSM in English).**
- **MCE in the Brazilian ecological transition.**
- **Mineral planning and security.**
- **External sources and mineral geopolitics.**
- **Industry and value chains for Brazil.**
- **Circularity and efficient use of resources.**
- **Mining, development and society.**
- **A Democratic governance for MCE.**

The aim is to develop a single, systemic framework, a general law to guide the actions of public and private agents. This law will promote the MCE chains in a responsible manner and in line with the public interest, starting from the current framework, but integrating, deepening and improving what is necessary.

Based on this document, a broad discussion is expected to encourage the development of a Bill, to be presented by the Legislative Branch, and which will have as its objective the Institution of the National Policy for Critical and Strategic Minerals.

The axes of PNMCE and proposals for its components are presented below.

1. Definition of Critical and Strategic Minerals - MCE

- PNMCE determines the publication of an official qualified list of minerals considered critical and strategic, to be reviewed and updated every 2 or 3 years, via sub-legal instruments.
- PNMCE differentiates the “critical” category from the “strategic” category and establishes levels of criticality and strategy in each of them and determines that differentiated provisions and political actions be drawn up for each level, in each category.
- Based on the existing framework, PNMCE determines that an assessment and the appropriate adjustments be made to the current parameters and criteria for the classification of mineral assets and their respective projects as part of the MCE list, complementing with criticality factors and levels of strategy, to be considered in the categorization.
- PNMCE characterizes the nature of the different types of MCE: energy transition minerals, food security minerals, minerals with high economic potential. It determines and qualifies the specificities and characteristics of each type, establishing measures appropriate to the diversity of challenges and opportunities for each one.

2. MCE in the Brazilian ecological transition

- Immediately after its establishment, PNMCE must promote the preparation of an initial estimate of national demand, in volume, for each MCE, considering the national ecological transition, ongoing industrial policies, the import and export of technological goods linked to the transition, the necessary increase in electrical capacity and its sources, investment in the production of green hydrogen, electrification of transport and equipment, agribusiness dynamics, new stimulus for public procurement, among others.

The estimate should consider more than one scenario, depending on the country's strategic choices, but always calculating total demand in an integrated manner.

- PNMCE determines the review of demand estimates for each of the MCEs every 4 years, considering horizons of 10, 20 and 30 years.
- PNMCE establishes export and import potentials and targets for each MCE, in line with the estimates defined above.
- In PNMCE, actions, projects and measures for promotion, incentive and public financing should be based on the estimates, cross-referenced with socioeconomic indicators at the national, regional and local levels. It will allow strategic decision-making, aligned with a broader policy of development and value addition.

3. Mineral planning and security

- Based on estimates of national needs, PNMCE foresees the establishment of medium- and long-term strategic objectives for the exploration of mineral resources, considering the temporality of market opportunities, technological and climate imperatives, long-term development, and national security regarding future supplies, among others. The strategic objectives, once established, must be reviewed every 10 years.
- PNMCE establishes the expansion and deepening of geological knowledge with a high level of detail, mainly in districts with the greatest potential for MCE, through the strengthening of the budgetary, technical and human capacities of the Brazilian Geological Survey (SGB).
- PNMCE determines that qualified information be disclosed on the presence, potential and location of MCE in Brazilian territory, including information on mineral concentration and quality, but

also logistical access, available energy, infrastructure, among others, in cooperation between the Brazilian Geological Survey (SGB) and the National Mining Agency (ANM), under the coordination of the Ministry of Mines and Energy.

- PNMCE establishes, in line with the National Mining Plan, the elaboration of long-term objectives (30, 40 and 50 years) on the strategic use of available reserves, as well as wealth to be preserved for future use, better market use and even the non-use of eventual reserves for economic, social, cultural and/or environmental reasons, bypassing short-term rationales. This long-term schedule can be revised every 10 years.

4. External sources and mineral geopolitics

- PNMCE establishes the preparation of an initial assessment of current regional and/or global alliances and their potential for specific agreements on MCE. Based on this assessment, to be updated annually, it establishes the definition of strategic objectives within the scope of the main alliances, diplomatic and commercial relations.
- PNMCE determines the creation and maintenance of a database and information on the current origin (countries) of MCE and associated products acquired by Brazil, especially those aimed at the ecological transition.
- PNMCE establishes goals and objectives regarding the import and export of MCE with Brazil's main trading partners.
- PNMCE must produce a protocol for the periodic analysis of Brazil's exposure to geopolitical and climate risks regarding the national supply of MCE for which it is not self-sufficient. Based on this analysis, risk mitigation measures should be proposed.

5. Industry and value chains for Brazil

- PNMCE determines that objectives, goals and deadlines be established for an increasingly greater proportion of processing and transformation of the most important MCE for the industry, in the national territory.
- Based on these objectives, PNMCE must establish the measures and investments necessary to achieve these goals and objectives of processing and adding value, promoting interministerial actions, public-private partnerships and development.
- PNMCE stipulates the preparation of a complete design of the main chains associated with MCE, from exploration to use in the battery industry, electric motors, renewable energy, among others.
- Based on knowledge about the various chains, PNMCE determines incentive measures and policies aimed at strengthening the chains associated with MCE with the greatest potential for economic development and generation of value and income..
- PNMCE requires transparency and the regular publication of information, studies and research that assess the impact of public policies on the sector, on the main chains, in order to provide entrepreneurs and investors with qualified information and predictability.
- PNMCE periodically establishes priorities regarding the main technological and innovation routes, identifying the main deficiencies and needs for investment in research and development and establishes criteria for public-private programs to encourage and invest in science, technology, innovation and human capacity.

6. Circularity and efficient use of resources

- PNMCE foresees the characterization and study of the current stage of circularity and efficiency routes in the MCE chains, considering the reduction of generation, repair, reuse, recycling and reintroduction, as well as efficiency gains.
- Based on these studies, PNMCE establishes quantifiable objectives in terms of circularity for the main MCE in 2030, 2040 and 2050, and points to the investments and policies needed to promote greater circularity and achieve these objectives.
- Periodically, PNMCE, in accordance with the defined production scales, evaluates, measures and reports the benefits of circularity and the reduction of mineral resource extraction, responsible waste management and socio-environmental impacts, generating greater sustainability, economic gains and strategic management of the reserves available in nature.
- PNMCE proposes political measures for tax and fiscal incentives to promote circularity routes, as well as technological investment to improve current knowledge and increase the potential for reusing raw materials and mined goods, through national and international public-private partnerships.

7. Mining, development and society

- PNMCE determines the creation of a systemic and integrated policy for the development of territories with projects and/or mineral potential linked to MCE, in the form of a Local Development Program in Mining (PDLM).

- PNMCE must develop an inter-ministerial and inter-federative model for implementing the PDLM in municipalities and territories, as well as incentives for public-private financing.
- PNMCE aims to establish, on the one hand, the importance of the role of environmental licensing for the activity of the mining sector, with a focus on mitigating and compensating for the impacts of mining enterprises and, on the other hand, the scope of a necessary broader development policy, aimed at addressing structural territorial contradictions and inequalities to be faced by the public and private sectors, through implementation of the PDLM.
- PNMCE establishes the tools and mechanisms of the PDLM, its conceptual and methodological characteristics, such as: Territorial Development Agenda; Strengthening of Human and Institutional Capacities; Financial Mechanisms and Instruments.

8. A democratic governance for MCE

- PNMCE establishes the creation of a Strategic Committee on MCE, linked to the National Council for Mineral Policy (Decree 11.419/2023), bringing together up to 12 members (six technical representatives appointed by the federal executive - MME, MMAMC, MDIC, MCTI, MF, MRE - one representative of states and municipalities, two representatives of the private sector and three representatives of civil society) to monitor the established standards and plans, implement policies, request studies and research, advise and make direct recommendations to the federal government and other public institutions.
- In line with other rules relating to the National Council for Mineral Policy, PNMCE guarantees resources for the Committee's ongoing work, consultation and hiring of specialists, as well as periodic meetings.

- PNMCE provides for the creation of forums and broad spaces, such as conferences and public meetings, for the participation of civil society and the private sector in PNMCE.
- PNMCE establishes rules and regulations for social participation in states and municipalities, within the scope of PNMCE.
- PNMCE determines channels, procedures and protocols for specific interministerial governance in necessary cases, for the implementation of projects and programs under the jurisdiction of more than one ministry.



IMPROVEMENT OF THE INFRALEGAL FRAMEWORK

This section herein presents some measures that can be taken in the short and medium term, as they do not depend on the approval of a specific law, but are based on the current legal framework and administrative structure. Even so, the following measures are connected to the principles of the foundations presented above and, in a certain way, should pave the way and facilitate the implementation of a law that institutes, in an integrated and definitive manner, PNMCE.

At the end of this series of recommendations and possible measures for a gradual advance in public policy, a Table was inserted that presents, in a simplified manner, the main regulatory frameworks and public policies for the mineral sector, currently in force. Each step to be taken, both for the establishment of PNMCE and in the implementation of measures, must consider the current framework presented.

Guarantee of the performance of regulatory and control bodies

Political coordination with the aim of ensuring that the distribution provided for in art. 2 of §2 of Law 13.540/2017 is fulfilled and that ANM, CETEM, IBAMA and FNDCT can receive the resources established by law.

Justification: A fundamental prerequisite for improving the mining sector is the proper functioning of regulatory and control bodies. The ANM should receive 7% of the CFEM value, as determined by Law 13.540/2017, as should the other bodies and funds of this resource. The Federal Government's budget has been subject to contingency for years and has not been passed on to the appropriate recipients of these resources.

Actions: Interministerial coordination to ensure the allocation of resources and budget execution.

Instrumento: Regulatory decree.

Adoption of sustainability and governance principles in current policy

A change to the decree establishing the Strategic Minerals Policy, with the aim of integrating the adoption of socio-environmental sustainability and good governance principles as a prerequisite for a project to obtain support in the environmental licensing process. This will contribute to increasing the quality and accuracy of the project, maximizing its potential and minimizing obstacles that may arise during its subsequent development.

Justification: Projects aligned with sustainability and governance principles will have greater credibility in state procedures and in obtaining the “social license to operate”.

Actions: Coordination with the MME and assessment of projects by representatives of the MMAMC and MDIC.

Instruments: Amendment of Decree 10.657 of 2021, which established the Pro-Strategic Minerals Policy.

Mercosur and strategic minerals

Create a group or space with the objective of integrating MERCOSUR member countries and associates, aiming to form a regional alliance and encourage investments in collaborative projects of geological knowledge, mineral research, R&D&I, socio-environmental sustainability and promote the production and transformation of strategic critical minerals in the region, as well as coordinate advances in the global transformation chain.

Justification: Several regions or blocs are organizing themselves for cooperation on critical and strategic minerals. Brazil, as a natural leader in the region, can promote an alliance with cooperation actions and coordination of complementary business ventures.

Actions: Coordination between the MRE, the MME, the MDIC, the MCTI and international development organizations.

Instruments: Cooperation agreements.

Support for the development of suppliers and local content

Establish minimum local content rules as a condition for companies with value-adding projects to be eligible to receive incentives (tax, credit, exchange, etc.) and format support for the development of suppliers in the country.

Justification: The main countries or blocs, such as the United States, the European Union and China, among others, adopt local content policies as a counterpart to the incentive packages offered to industries for projects that add value to mineral goods. Brazil can adopt a similar policy to promote the development of the equipment industry and the related services sector.

Actions: Coordination between MDIC, MME, MCTI and SEBRAE to define and implement rules and coordination between MDIC, BNDES, Finep, EMBRAPII to support the development of suppliers.

Instruments: Decree and financing options.

Incentive for decarbonization

Encourage small and medium-sized mining companies to use, in their production and consumption, electricity from renewable sources, such as photovoltaic wind energy and biomass, aiming at the production of minerals with a smaller carbon footprint.

Justification: Promote the diversification of the energy matrix in the production of minerals for the generation of renewable energy, such as wind photovoltaic and biomass, and reduce the demand and consumption of fossil fuel-based sources in the production process.

Actions: Coordination between MMAMC, MME, MDIC, MEMEPP, and BNDES to promote investment and facilitate credit under special conditions so that PMEs in the mining sector of MCE can invest in renewable energy systems, thereby mitigating GHG emissions.

Instrumento: Interministerial ordinance.

Digital Platform “Territorial Overview of Strategic and Critical Minerals”

Establish the digital platform “Territorial Overview of Strategic Minerals” with the aim of facilitating investors’ visualization of territorial sites with potential for strategic minerals, providing information on the number of research requests and mining ordinances, in addition to information on the geology of the areas.

Justification: A platform containing this information can provide professionals involved in mineral research and prospecting with the ability to visualize specific locations with potential for strategic and critical minerals. This platform, focused especially on minerals essential

for the energy transition, will complement and enrich the data already available on the P-3M platform, which is updated by the SGB-CPRM.

Actions: Articulation between MME, MMAMC, SGB, ANM, IBAMA.

Instruments: Technical cooperation agreement.

Integration and provision of public and private geological data in the SGB

Make geological, geophysical and geochemical information generated by companies available in a single and accessible database under the technical management of the SGB-CPRM with the aim of enriching and making available Brazil's geoscientific knowledge.

Justification: The geological information generated by companies and recorded in the mineral research reports, whether positive or negative, was delivered to the former DNPM and now to the ANM. The information, however, is scattered and is not properly analyzed or incorporated into the country's geoscientific knowledge. The proposal is to study the policies of countries such as those mentioned and develop a procedure suited to the Brazilian reality for transferring the information to the SGB, which will be responsible for the appropriate processing and incorporation of this data into public geological knowledge. The incorporation into geological knowledge must take place with the legal deficiencies and reservations, to ensure the competitiveness of companies that conduct mineral research in Brazil, in accordance with the best international standards.

Actions: Articulation between MME, ANM, SGB-CPRM, IBAMA.

Instruments: Interministerial ordinance.

Increase circularity efficiency in MCE production for the energy transition

Increase efficiency in mining and beneficiation of minerals for the energy transition, aiming to achieve higher recovery/reuse rates of materials and, consequently, increase the availability of these minerals/metals.

Justification: The application of circular economy practices in global and national mining is still limited. These practices aim to maximize the use of mineral substances in mines, which is considered essential to reach higher levels of responsible mining. Improving operational efficiency is essential to increase the recovery of minerals/metals.

Actions: Articulation between MME, CETEM, EMBRAPPII, FINEP, Sistema S and the productive sector to identify technological routes and opportunities and propose regulations for circularity principles in mining practices.

Instruments: Interministerial ordinance.

Recycling of lithium-ion batteries and rare earth magnets

Foster the creation of a national network for the collection and recovery of lithium-ion batteries and rare earth magnets, with the objective of recovering MCE such as: lithium, cobalt, graphite and neodymium, dysprosium and terbium.

Justification: The high value of metals and materials that make up lithium-ion battery components should be an incentive for their recovery and use, avoiding unnecessary disposal, waste and environmental contamination. However, it is necessary, at least initially, to encourage the formation of a collection and recovery network,

through appropriate incentives. In Brazil, the recovery and recycling of lead-acid batteries is successful and can serve as a model for the introduction of best practices in collection and logistics for new types of batteries and energy accumulators.

Actions: Articulation of MMAMC with MDIC, MME, MCTI to promote the formation of collection and logistics networks and support for the development of processes for the recycling of critical metals and other materials from batteries and components removed from wind turbines and electric motors, aiming at their full reuse.

Instruments: Ordinance to regulate Law 12.305/2010, the National Policy on Solid Waste (PNRS).

Study of strategic and critical material flows

Prepare comprehensive and detailed studies on the production chains that require strategic minerals in Brazil, with the aim of identifying gaps, obstacles, bottlenecks and opportunities.

Justification: It is necessary to have knowledge about the flow of strategic materials through the production chains established in Brazil, including information on quantities, prices and costs involved. It will allow developing strategies to better understand the consumption, use and recycling of inputs and components of products that require MCE. A systematic study with this scope is essential to understand the country's dependence on chemical elements, minerals and strategic materials present in objects and equipment used in Brazil.

Actions: Coordination between MCTI, MME and MDIC to make resources available for financing these studies.

Instruments: Orders and/or public calls for proposals based on notices from MCTI and its agencies.

Prospective studies and analyses

Establish partnerships and mechanisms to conduct prospective analyses of investments, consumption, new projects and job creation at macro and micro levels, with the aim of supporting the government and companies in their policies and decisions.

Justification: These partnerships should involve the productive sector (which holds information on new investments), governments (which establish public policies, plans and programs), academia and research centers (with the capacity to conduct technical, socio-environmental, political and prospective studies) and society (which will be impacted by these activities).

Actions: Coordination between MCTI, MME, MDIC to provide resources to finance studies.

Instruments: Orders and/or public calls for proposals based on notices from MCTI and its agencies.

Support for PME and APLs in Brazilian mining

Foster and disseminate good operational and ESG practices with the aim of improving the performance and adoption of digital technologies in small and medium-sized enterprises (PMEs) and Local Production Arrangements (APLs) in the mining and mineral processing sector that operate in the production of strategic or critical minerals.

Justification: The focus of this proposal is on the more than two thousand mining PMEs, with revenues between BRL 4.8 million and BRL 300 million, representing around 10% of the sector's revenue, in addition to approximately 100 mineral-based APLs. The vast majority of PMEs do not have access to instruments and agencies that pro-

mote technological innovation, such as the Lei do Bem, Finep, BNDES, among others, and do not engage with Brazilian ICTs in R&D&I projects. A program that combines government funding with the expertise of the Mining Hub, supported by IBRAM, focused on the development of hundreds of mining startups (mining techs) can modernize this universe of PME's technologically and environmentally.

Actions: Arrange the participation of MCTI/Finep, MME, MDIC/BNDES, IBRAM and Mining Hub, and associations representing mining segments, especially those composed of PME's or organized in APLs, to format a program with public funding.

Instruments: Interministerial ordinance.

Amazon and responsible mining

Format a program with initiatives and projects integrated with industrial mining in the Amazon, focusing on MCE, with the aim of promoting sustainable development, collective benefits and social well-being.

Justification: The Brazilian Amazon region is rich in minerals essential for the energy transition and agriculture, as well as presenting geological potential for new discoveries. The region can benefit from the engagement of industrial mining in more sustainable practices beyond its operational territory and its typical municipal area of influence, expanding its operations in the region in a coordinated manner between companies and public institutions, contributing to the conservation, forest and environmental restoration of the biome and the promotion of new nature-based economies in the region.

Actions: Inter-ministerial coordination, productive sector and multi-lateral credit organizations.

Instruments: Interministerial ordinance.

Improvement of the PNRS to improve urban mining of MCE

Contribute to the improvement of the National Solid Waste Policy (Law No. 12.305/2010) with the aim of improving the efficiency of urban mining of materials containing MCE, through the improvement of reverse logistics and support for enterprises dedicated to processing for reuse of components or recycling of materials in Brazil.

Justification: Urban mining is considered an important activity to reduce the primary production of materials, as well as contributing to the reduction of energy and water consumption and reducing waste and the disposal of materials that can be reused and recycled. In addition, it is one of the actions indicated in circular economy policies adopted by several countries. Some of the strategic materials found in components, parts and pieces of electronic products are already regulated, but there are still many more items to be identified in other groups of products and equipment that require specific regulation. The suggestion is to conduct studies to propose regulations for urban mining of objects and equipment, in whole or in part, that encourage the collection, disassembly, and separation of parts and components of a series of products and equipment, giving them a commercial destination for the reuse of components or recycling of elements or substances that contain strategic materials for Brazil.

Actions: Articulation between MMAMC, MS, MME and MCTI.

Instruments: Interministerial ordinance.

Transparent use of CFEM by mining municipalities and states

Develop mechanisms for simplification and synthesis with the aim of facilitating both the work of municipal managers in planning and execution and access by the general public interested in the forecast, payment and allocation of revenues obtained through CFEM transfers.

Justification: CFEM represents an important source of budget revenue, especially for the 30 main mining municipalities, which receive approximately 90% of the BRL 8 to 10 billion annually transferred to all municipalities. Transparency is the first step towards the efficient, effective and efficient use of CFEM. Law 13.540/2017 determines that the use of CFEM is available to the public. In the state of Pará, the Court of Auditors of Municipalities (TCM) regulated and determined the publication of data on the use of CFEM. In the state of Minas Gerais, standardization is being recommended for the provision of municipal accounts. CFEM represents an important source of budget revenue, especially for the 30 main mining municipalities, which receive approximately 90% of the BRL 8 to 10 billion annually transferred to all municipalities. Transparency is the first step towards the efficient, effective and efficient use of CFEM. Law 13.540/2017 determines that the use of CFEM is available to the public. In the state of Pará, the Court of Auditors of Municipalities (TCM) regulated and determined the publication of data on the use of CFEM. In the state of Minas Gerais, standardization is being recommended for the provision of municipal accounts.

Actions: The articulation between the federal government, states and municipalities and AMIG representative associations, to establish an alliance to improve transparency in the application of CFEM. Creation and expansion of mechanisms and forums for debate and public participation on best practices for the allocation of these revenues.

Instruments: Cooperation agreements that standardize the dissemination of data in a simplified manner.

Traceability of MCE produced in the Amazon

Promote the traceability of MCE in the Legal Amazon and in other Amazonian countries.

Justification: Traceability is a fundamental indicator of the ESG Agenda, allowing the recording of the main characteristics of the product, be it its origin, good practices, use of natural resources, etc.

Actions: Coordinating ministries and Amazonian countries with S&T organizations and the productive sector, to develop a study and technology for the tracking of mineral products.

Instruments: Interministerial decree and/or ordinance and Cooperation Agreements.

REGULATION AND PUBLIC POLICY FRAMEWORKS FOR THE MINERAL SECTOR

- Creation and installation of the National Mining Agency - ANM (Law No. 13.575/2017).
- Publication of Decree No. 9.406/2018, which regulates Decree-Law No. 227/1967 (Mining Code), and its complementary normative acts: Laws No. 6.567/1978 (special regime for exploration and use of mineral substances), 7.805/1989 (regime for permitting small-scale mining), and part of Law No. 13.575/2017.
- Update of CFEM legislation (Law No. 13.540/2017), improving collection and distribution criteria and reviewing the calculation basis in light of the sector's evolution and changes in circumstances.
- Publication of geophysical surveys focusing on strategic minerals by SGB/CPRM: (i) Surveys for lithium, graphite, phosphate, potassium and rare earths; (ii) Assessment of the potential of agro-minerals in Brazil; (iii) Assessment of the potential of cobalt in Brazil, and (iv) Assessment of the potential of radioactive minerals in Brazil.
- Publication of Decree No. 10.657/2021, which created the Pro-Strategic Minerals Policy and the Interministerial Committee for Analysis of Strategic Minerals Projects.
- MME Resolution No. 2 of 2021, which defines the list of strategic minerals for the country.

- Publication of Decree No. 10.746/2021, which instituted the Policy for Science, Technology and Innovation of Advanced Materials and the Advanced Materials Steering Committee.
- Inclusion of mining activities in the National Fertilizer Plan 2022-2050, March 2022.
- Preparation of the National Mining Plan 2050, still under validation by the MME (2022 and 2023).
- Decree No. 11.108/2022, which instituted the Brazilian Mineral Policy and created the National Council for Mineral Policy (CNPM).
- Law No. 14.514/2022, which provides for the company Indústrias Nucleares do Brasil S.A. (INB), on the research, extraction and marketing of nuclear minerals, their concentrates and derivatives, and nuclear materials, and on mining activities.
- Decree No. 11.419 of February 24, 2023 (which amended Decree No. 11.108 of 2022) establishes the Brazilian Mineral Policy (PMB) and the National Council for Mineral Policy (CNPM).



FINAL CONSIDERATIONS

The set of principles and guidelines presented here aims to contribute to the construction of the National Policy for Critical and Strategic Minerals in Brazil. The document presents elements that address the complexity of the issue, as well as taking into account the structural challenges related to Brazil's socioeconomic development, bringing aspects of social justice and sustainability into its broad understanding, as well as the non-violation of human rights.

PNMCE, in itself, represents an important advance in the country's legal framework, as it is an instrument that positions and guides Brazil in relation to global strategies for decarbonizing the economy and confronting the climate emergency.

The proposal is that PNMCE should enable the integration of policies aimed at Critical and Strategic Minerals, as well as other sectoral and governance policies between the various federative and inter-ministerial spheres, providing greater security and stability to the entire population, territories, the private sector, commercial partners and investors.

Finally, as a society and as a nation, Brazil cannot ignore an absolute imperative that must guide its ecological transition process: to make the transition, and especially the profound changes in its economy, not only a way to address climate change, but also to drastically reduce its social inequalities. PNMCE, as presented here, faces this challenge and is yet another instrument that will serve the country to follow this path towards a fairer world, on a more sustainable planet.



