Regulatory Governance in the Mining Sector in Brazil

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Foreword

Laws and regulations are one of the main levers governments can use to improve the well-being of societies, alongside fiscal or momentary policy. But governments need to ensure that laws and regulations are fit for purpose and effective in achieving goals.

The report *Regulatory Governance in the Mining Sector in Brazil* identifies the gaps, barriers, implementation flaws or inefficiencies that affect the regulatory framework of the mining sector in Brazil. It also assesses the governance arrangements of the National Mining Agency of Brazil (ANM). The report takes stock of the recent reforms in the mining sector in Brazil, ascertains the areas which poses the greatest challenges for the regulation in mining to perform effectively, identifies and describes the reforms that created the ANM, and documents the agency's current regulatory practices. It assesses these against OECD principles in regulatory policy, as well as country experiences from Australia, Chile, and Mexico, and provides recommendations to continue the reform efforts.

The review was carried out under the auspices of the OECD Regulatory Policy Committee, whose mandate is to assist both members and non-members in building and strengthening capacity for regulatory quality and regulatory reform. The report was shared for comments with a wide range of stakeholders in Brazil and internationally, including authorities, experts and private representatives in the areas of mining, labour, environmental protection, and better regulation.

The information used for the preparation of this report came from five main sources: desk research conducted by the OECD Secretariat, a questionnaire answered by key stakeholders; information submitted by international experts to prepare the country case studies; a virtual fact-finding mission during October and November 2020 with Brazilian government agencies, NGOs, academics and industry associations; and a virtual policy workshop on 19 and 20 January 2021. It is to be noted that most of the work was carried out during the COVID-19 pandemic, which had repercussions on logistics and availability of stakeholders. Statistics and figures gathered as part of the desk research came predominantly from official sources, and from international organisations.

The report was reviewed by the OECD Regulatory Policy Committee on 21 April 2021, and approved and declassified by the committee on 7 May 2021. It was prepared for publication by the Secretariat.

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Abbreviations and acronyms

ABNT	Brazilian Association of Technical Norms
ANM	National Mining Agency (*Agência Nacional de Mineração*)
ANVISA	National Health Regulatory Agency (*Agência Nacional de Vigilância Sanitária*)
ASM	Artisanal, small-scale mining
AUD	Australian Dollar
BRL	Brazilian Real
CADE	Economic Defence Management Board, Brazil (*Conselho Administrativo de Defesa Econômica*)
CAGED	General Registry of Employed and Unemployed (*Cadastro Geral de Empregados e Desempregados*)
CETEM	Centre of Mineral Technology, Brazil (*Centro de Tecnologia Mineral*)
CFEM	Financial Compensation for the Exploration of Mineral Resources (*Compensação Financeira pela Exploração de Recursos Minerais*)
CNRH	National Council of Water Resources (*Consehlo Nacional de Recursos Hídricos*)
COAG	Council of Australian Governments
COCHILCO	Chilean Copper Commission
CODELCO	Chilean National Copper Corporation
CONAMER	National Commission on Better Regulation (*Comisión Nacional de Mejora Regulatoria*)
CPRM	Geological Survey of Brazil (*Serviço Geológico do Brasil*)
DEM	Department of Energy and Mining, South Australia
DF	Federal District (*Distrito Federal*)
DGDM	General Directorate of Mining Development, Mexico (*Dirección General de Desarrollo Minero*)
DGM	General Directorate of Mines, Mexico (*Dirección General de Minas*)
DIA	Environmental Impact Statement
DNPM	National Department of Mineral Production (*Departamento Nacional de Produção Mineral*)
EIA	Environmental Impact Assessment
ENAMI	National Mining Enterprise, Chile
ENAP	National School of Public Administration (*Escola Nacional de Administração Pública*)
EPA	Environmental Protection Authority, South Australia
FIFOMI	Mining Development Trust, Mexico (*Fideicomiso de Fomento Minero*)
FNDCT	National Fund for Scientific and Technological Development, Brazil (*Fundo Nacional de Desenvolvimento Científico e Tecnológico*)

FNMA	National Envieronmental Fund, Brazil (*Fundo Nacional do Meio Ambiente*)
FOB	Free on board
GDP	Gross Domestic Product
GUT	Gravity-Urgency-Tendency
IBAMA	Brazilian Institute of Environment and Natural Renewable Resources (*Instituto Brasileiro do Médio Ambiente e dos Recursos Naturais Renováveis*)
ICT	Information and Communication Technologies
INEGI	National Institute of Statistics and Geography, Mexico (*Instituto Nacional de Estadística y Geografía*)
LOA	Annual Budget Law, Brazil (*Lei Orçamentária Anual*)
MDNP	Mineral Development Network Platform
ME	Ministry of Economy (*Ministério da Economia*)
MME	Ministry of Mines and Energy (*Ministério de Minas e Energia*)
MoU	Memorandum of Understanding
MXN	Mexican Peso
NBR	Brazilian Norm (*Norma Brasileira*)
NOM	Mexican Offical Standards (*Norma Oficial Mexicana*)
NMX	Mexican Standards (*Norma Mexicana*)
NSW	New South Wales
NSW-RR	New South Wales Resource Regulator, Australia
PAINT	Annual Plan for Internal Audits (*Plano Annual de Auditoria Interna*)
PMD	Mining and Development Programme (*Programa Mineração e Desenvolvimento*)
PROFEPA	Federal Environmental Protection Agency, Mexico (*Procuraduria Federal de Protección al Ambiente*)
Radar	Network for the Articulation of Regulatory Agencies, Brazil (*Rede de Articulação das Agências Reguladoras*)
RAIS	Annual Report of Social Information (*Relação Annual de Informações Sociais*)
RAL	Annual Mining Report (*Relatório Annual de Lavra*)
RCA	Environmental Qualifications Resolutions
RIA	Regulatory Impact Assessment (*Análise de Impacto Regulatório*)
RPSB	Periodic Review of Dam Safety (*Revisão Periódica de Segurança de Barragem*)
SE	Ministry of Economy, Mexico (*Secretaría de Economía*)
SEMARNAT	Ministry of Environment and Natural Resources, Mexico (*Secretaría de Medio Ambiente y Recursos Naturales*)
SERNAGEOMIN	National Service of Geology and Mines, Chile
SGM	Mexican Geological Service (*Servicio Geológico Mexicano*)
SICOP	Porcess Control (*Sistema de Controle de Processos do DNPM*)
SIGBM	Integrated System for the Management of Mining Dams Safety (*Sistema Integrado de Gestão de Segurança de Barragens de Mineração*)
TAH	Annual Tax per Hectare (*Taxa Annual por Hectare*)
TCU	National Court of Accounts (*Tribunal de Contas da União*)
ZAS	Self-rescue zone

Executive summary

Mining plays a crucial role in Brazil's economy: in 2019, mineral extraction accounted for 2.4% of GDP. Nonetheless, in recent decades the efforts and resources devoted to regulatory quality in the sector have declined, including in the enforcement of rules. In addition, mining activities and their impact tend to be a negatively perceived by the public. This sentiment was further fuelled by the accidents of Mariana (2015) and Brumadinho (2019).

In light of this context, a series of reforms to improve the sector's performance have been introduced. The creation of the National Mining Agency (ANM) in 2017 as an autonomous regulator represented the first major modification to the institutional landscape in almost 60 years. ANM replaced the former National Department of Mining Regulation as the sector's regulator and was given the objective of using regulatory instruments to ensure that mineral resources in Brazil are managed in a socially sustainable way. Despite the relevance of the new regulatory agency for the sector, ANM still faces important restrictions in terms of budget allocation, staffing and culture change, which limit its capacities to discharge its responsibilities successfully.

In particular, inspections and regulatory enforcement activities could be strengthened to ensure that efforts are allocated proportionally and focussed on those activities that pose the greatest risk. Although the Agency has taken actions such as hiring new temporary inspectors and using technology to monitor the level of risk in tailings dams, inspection activities remain burdensome and insufficient. By fostering co-ordinated efforts with other institutions such as the Environmental Inspectorate (IBAMA), the Labour Inspectorate, and subnational agencies, the National Mining Agency could better allocate its limited resources and ensure the regulatory framework is adequately implemented. The latter is crucial for reducing the risk of accidents and preventing negative environmental and social impacts from mining activities.

In addition to the changes in the institutional set-up, Brazil has also embarked on revising and completing the mining regulatory framework. Important regulations regarding tailings dams' safety and mines closures have been developed or updated, often using good regulatory policy tools as regulatory impact assessment and stakeholder engagement. Although there have been attempts to update key legislative pieces such as the Mining Code (1967) and complementary regulations, there is still no consensus on the scope of the modifications needed.

Finally, ANM has made efforts to tackle administrative burdens, both in the back office and those faced by citizens and businesses. Burdens have been reduced by introducing ICT tools to streamline some processes and move to a more digital environment.

Main recommendations of the report

- Establish mechanisms and actions that promote regulatory coherence between the federal government and the states to avoid gaps or overlaps in the regulation dealing with environmental impact of tailing dams.

- In the *ex post* assessment of mining regulation related to the management of risks, ensure that a risk-based approach is applied to artisanal small-scale mining, including *garimpeiros*.
- Engage with staff to increase communication on the new working culture of ANM, foster feedback loops and collaboration across different areas of the Agency. ANM could promote collaboration across different superintendences and regional units to enhance the exchange of capabilities and best practices inside ANM.
- Stimulate the systematic use of data in the regulatory process. Employees from all levels, but particularly managers, should stand behind ANM's new working culture in which data drive regulatory decisions. Clearly communicate the benefits of evidence-based decision making and provide staff with the necessary inputs to use data and information efficiently.
- Advocate for greater financial independence for ANM's by promoting for an increase in the financial resources allocated to the Agency.
- Develop and implement a detailed policy on regulatory enforcement and inspections for the mining sector, which should include inspections based on evidence, inspections based on risks, co-ordinated efforts across federal agencies and subnational governments, intensive use of ICT, and a well-resourced inspections programme.
- Build trust, engage stakeholders and provide feedback. ANM could make information available regarding the inspections plan, enforcement actions and the results of these activities from a compliance perspective. Transparency and accountability should underpin all inspections and regulatory compliance activities.
- Develop and implement a detailed policy on administrative simplification and burden reduction for all government formalities in the mining sector, with an emphasis on licensing.

1 Assessment and recommendations

Overarching issues

Assessment

Issue 1: There is a negative perception of the public towards mining activities in Brazil; an effective regulatory and policy framework and a strong and agile National Mining Agency are likely to contribute to reduce this perception, amongst other actions

A common element identified by the review team was the existence of a negative perception by the public towards mining activities in Brazil. Several groups of stakeholders – including public officials at federal and regional level, private and business representatives, academics and experts, amongst other – raised this as an issue, which seems to permeate across the Brazilian society.

The negative sentiment towards mining activities in Brazil could be traced to historic events and cultural attitudes, dating to colonial times or to the model of mining activities from several decades ago. In these historical views, the mining sector is characterised by having a diminished role in policy objectives on labour safety or environmental protection, in favour of economic profit, mainly by large companies.

Undoubtedly, one of the main reasons which appear to have exacerbated this negative perception are the safety accidents of Mariana (2015) and Brumadinho (2019). These accidents unveiled a combination of poor performance by the former National Department of Mineral Production (DNPM) in the case of the 2015 accident, the negligence of private companies in their reporting and risk-management duties, coupled with failures in the regulatory enforcement and supervision duties of government agencies. The Brazilian government has taken steps to remedy the consequences and to prevent any future similar events, both from the policy and regulatory angles, including reforms to create and strengthen the ANM. Yet, a negative perception on mining by both the communities where these activities take place and by society in general seems to be widespread.

This negative perception is at odds with the economic importance of the mining sector in Brazil, which in 2018 amounted to 2.44% of the GDP (Ministério de Minas e Energia, 2020[1]). The question to tackle is how to reconcile a sector of such an economic significance, which contributes to the creation of jobs and wealth for localities, regions, and for the country as whole, with the public perception.

There is a clear need to show the positive net effects of mining activities to the population. Additionally, there is a need to build community trust through transparency and ongoing engagement to demonstrate that the regulatory regime is effective in balancing commercial and social objectives. The Brazilian government is taking action to tackle this challenge as shown by the Mining and Development Program (PMD) launched by the Ministry of Mines and Energy in September 2020. The PMD defines the Government's agenda for the country's mineral sector. The PMD encompasses 10 plans and 110 goals for the period 2020/23 and aims at the quantitative and qualitative growth of mining in Brazil. In particular, the PMD has a series of goals related to improving the social perception of the Brazilian mineral sector, and whose actions for implementation are already underway.

While several government actions are needed to address these challenges, and many are already being undertaken as part of the PMD, an effective and transparent regulatory and policy framework and a strong, independent and agile National Mining Agency are also likely to contribute to address them.

Clear and cost-effective laws and regulations in the mining sector, and their effective implementation and enforcement, contribute to the achievement of public policy objectives, which should reflect a balance between economic objectives, as well as environmental and worker´s protection, amongst others. Similarly, well-resourced regulatory agencies in the sector, such as the National Mining Agency, with the capacity to foresee public policy challenges and tackle them timely and effectively, are a necessary element in the pursuit of these objectives.

Hence, it is key to address the issues identified in this paper, which include a combination of gaps in the regulatory framework for the mining industry in Brazil, the capacity to implement and enforce existing and future regulation, and an imperative need of resources by the ANM, amongst others.

Recommendations

Ensure implementation of the provisions of the PMD aimed at improving the perception of the public towards mining sector **and carry out periodic assessments** of their impact to complement and enhance the strategy**.**

Establish regular venues in which stakeholders can provide feedback and air their views and concerns on how the improvement of the regulatory framework in the mining sector and the performance of the ANM can increase their contribution to public policy objectives, such as economic performance, environmental and worker's protection, amongst others.

Build trust, engage stakeholders and provide feedback. ANM could make available to the stakeholders information regarding the inspections plan, enforcement actions and the results of these activities from a compliance perspective. Publicly available data that is easily retrievable by citizens is a right step to increase trust in the performance of the Agency. Transparency and accountability should underpin all inspections and regulatory compliance activities.

The regulatory framework of the mining sector in Brazil

Assessment

Issue 2: There is room to update the Mining Code and complementary regulations to ensure the management of critical risks

The Mining Code (Decree Law No. 227/1967) is the main piece of legislation that regulates mining activities in Brazil. For the past years, there have been intermittent discussions as to whether a new mining code should be issued to make the process of regulation mining risks more efficient and effective, amongst other topics. Nevertheless, only a few amendments have been passed, amongst them the reform which led to the enactment of Law No. 13.575 that created the National Mining Agency (ANM) to replace the former National Directorate of Mineral Production (DNPM).[1]

The review team registered that there seems to be a consensus amongst stakeholders regarding the need to update the Code and complementary regulations. However, there was no clear definitions as to which areas require reforms to enhance the effectiveness of regulatory provisions in the mining sector, with a few exceptions.

One area that was pinpointed to require regulatory reform includes mining closure. There is a need for specific regulations to guarantee a proper management of the closure and remediation processes for a mining project. Despite some provisions on mining closure in other legal instruments, there is a gap which

makes it difficult for mining companies to implement specific measures aimed at achieving a proper remediation of areas impacted by mineral extraction and processing activities, as well as to fostering an adequate closure of depleted mines.[2] This specific issue is addressed further below.

There are also elements on safety and protection of workers that require attention to improve the corresponding regulatory framework. This includes safety standards for tailing dams, and other critical topics such a mine ventilation and rock geomechanics. This specific issue is addressed further below. Nevertheless, a further detailed assessment on safety and protection of workers in the mining sector is needed to ascertain the need for filling gaps or reforming existing provisions to reduce the risk of mining accidents an enhance the welfare of workers.

Issue 3: Brazil has recently updated its regulatory framework on tailings dams' safety. The challenge is to ensure its full implementation.

In Brazil, the National Dam Safety Policy, established by Law No. 12.334/2010, states that the operator of a dam is legally responsible for the safety of the infrastructure. The ABNT/NBR Technical Standard No. 13.028/2017 regulates the safety of dams and specifies the minimum requirements for the preparation and presentation of mining dam slats. CNRH Resolution No. 143/2012 also establishes general criteria for classifying dams by risk category, potential damage associated to it and by the volume of the reservoir (the tailings pond).[3]

Much of the current regulation regarding the safety of tailings dams in Brazil addresses the gaps that existed before the accidents in Mariana (2015) and Brumadinho (2019) caused by the detachment of these structures. These two accidents in such a short period increased public concerns over the safety of tailings dams, in particular, those that have been declared inactive (MDNP, 2020[2]). There are high risks related to the safety of tailings dams. This topic has put the Brazilian mining industry and the mining sector worldwide, in the spotlight for the lack of adequate management measures to guarantee high levels of safety and environmental protection. A strong criticism coming from the civil society and industry associations was the lack of sufficient inspection of the tailings dams. To tackle this criticism, the Brazilian government conducted a process of revisions of the regulations in an effort to align them with international best practices.

After the accident of Mariana, the former DNPM issued Ordinance No. 70.389/2017 that modified the National Registry of Mining Dams, reviewed the classification criteria for tailings dams, revised the requirements of the emergency action plan, and established mandatory periodic inspections.[4] In addition, the Integrated System for the Management of Mining Dams Safety[5] (*Sistema Integrado de Gestão de Segurança de Barragens de Mineração,* SIGBM) was established, allowing remote supervision of the safety of the dams by ANM. This is a unique online database that provides ANM and the general public[6] with access to key information on each registered tailing dam in the country. Likewise, the ordinance ordered the performance of mandatory periodic safety reviews of the dams (RPSB) based on their risk classification.

On the other hand, after the Brumadinho accident, ANM Resolution No. 13/2019 prohibited the construction of upstream dams in Brazil, which are characterised by being more susceptible to instability situations (especially in seismic areas) and by presenting a higher risk of detachment. These types of dams have been preferred by some mining companies in Brazil, as they represent the lowest construction cost. It is estimated that 84 mining dams were built with the same methods as the Brumadinho.[7] Given its greater risk, this type of deposit was already prohibited in other countries in the region, such as Chile and Peru.[8]

Recently, the Brazilian government has enacted Law No. 14.066/2020,[9] a bill that amends Law No. 12.334/2010[10] and imposes stringent safety rules and inspection for upstream tailing dams in the mining industry. This law forbids the construction or raising of tailings dams upstream, which are the ones built by placing successive layers of mineral waste one on top of the other (the same type that caused the

Brumadinho disaster in January 2019). Besides, the law mandates the decommissioning of all these structures until 02/25/2022. Mining companies are also responsible for drafting an Emergency Action Plan, which execution is mandatory by those responsible for dams.[11] Likewise, the law establishes that areas degraded by mining accidents or environmental disasters are among those that have priority to receive resources from the National Environmental Fund (FNMA). The new legislation also sets fines of up to US$200 million to mining companies if they fail to comply with the safety rules. It also forbids the construction of potential tailings dams close to communities that are within 10 km radius (inside the ZAS or the "self-rescue zone")[12] or within a distance corresponding to a flood wave arrival time equal to thirty minutes.

Despite the improvements in the regulation of the safety of mining dams, Brazil still has important gaps to be filled in the different stages of tailings dam management. In general, the legislation establishes important scopes for the safety of the dams during the operational phase of the mining project, such as that the inspection be carried out during the entire useful life of the project or that there be an emergency action plan (PAEBM).[13] Additionally, in the operation stage, the safety of the dams is supervised by the ANM, which oversees the implementation of the safety plans of the mining dams. This can be done through the information registered in the Integrated System of Mining Dams Management (SIGBM) or through on-site inspections.

However, as discussed in an issue further below, the ANM faces severe restrictions in terms of resources and staff that hinders its ability to carry out enforcement and inspections activates. There are already efforts underway to tackle this challenge,[14] although a long-term solution should be sought to aim for an effective supervision of rules in tailing dams.

Issue 4: Brazil could complement the provisions regarding the environmental impact of tailing dams and publish specific regulations for their closure.

Regarding the regulation of tailings deposits in the design stage, regional governments establish the legislation that obliges the mining concessionaire to carry out an environmental impact assessment (EIA) to start its mining activities. In Minas Gerais and several other states an environmental licence is required for each new addition/extension of a mine, including tailing dams.[15] However, guidance on the impacts that should be considered when assessing tailings dams from an environmental perspective are yet to be defined.[16]

Brazil also lacks specific regulations regarding mining tailings in relation to a mine closure plan. In the closure stage, there are no legal provisions regarding the treatment of mining tailings inside a project of mine closure and rehabilitation of impacted areas.[17] In that sense, Brazilian provisions differ from regulations such as those of Australia, where tailings "decommissioning" is aligned with the mine closure plan and, in addition, proposed tailings decommissioning designs are tested through closure trials during the operation phase. Therefore, the environmental impact assessment, which includes a plan for the rehabilitation of degraded lands, is used in Brazil to manage matters related to the abandonment of tailings ponds and dams.

Brazil is taking steps towards more efficient regulations regarding tailings management after the passing of Law No. 14.066/2020.[18] However, there is still room for improvement. In this sense, Brazil could improve its regulatory framework by including specific regulations for the dismantling of tailings ponds after the closure of operations. Likewise, given the situation of its current mining dams, environmental impact assessments should be requested specifically for the decommissioning and abandonment of tailings dams.

Issue 5: Although Brazil has started a comprehensive review of safety standards for tailing dams, other critical topics such a mine ventilation and rock geomechanical stability have not been considered for an upgrade in the near term.

Reforms to improve mining regulations centred on controlling critical risks and preventing accidents are still pending. There are uneven efforts to modernise and update the mining regulatory framework with a strong focus on tailings dams' safety in detriment of other areas, such as geomechanical and geotechnical standards,[19] ventilation safety criteria, underground and open pit stability conditions, mine pipelines, etc. The current regulatory environment in Brazil is very reactive rather than preventive.

ANM has started a review of certain regulations through its Regulatory Agenda 2020/2021 (Resolution No. 20/2019). However, after the accidents of Mariana (2015) and Brumadinho (2019), reforms of safety regulations in the Brazilian mining industry have focused on increasing the *security factor* of tailings dams and on specific topics (tailings dam certification, reuse of tailings, fossils exports, economic plans for mineral usage, border strip licensing processes, and management of conflicts in geo-mining territorial ordering). Even though, the constant assessment of technical regulations is necessary to prevent accidents and reactionary policies, there is no plan to review safety regulations and other aspects of the mining regulatory framework such as safety standards and inspection processes.

Recommendations

Carry out regular public consultation exercises to collect feedback from stakeholders to identify specific areas in which there is need to carry out updates to the Mining Code and complementary regulations. The *draft OECD Best Practice Principles on Stakeholder Engagement in Regulatory Policy* (OECD, 2017[3]) can be employed to guide the exercises.[20]

Programme to undertake *ex post* assessment of specific topical areas of the Mining Code to ensure that critical risks are being properly regulated and managed. *The OECD Best Practice Principles on Reviewing the stock of regulation* (OECD, 2020[4]) can be employed to guide the exercises.[21]

One of the areas in which Brazil could undertake an *ex post* assessment of the regulation is on tailing dam's safety. This exercise should help to determine if there are any gaps in the implementation of the corresponding legal instruments, and the reasons for this, and whether the policy objective of enhanced safety is being achieved in a cost-effective manner. The results can help in preparing effective communications for the public at large of the achievements of the reforms to the regulatory framework and their implementation after the accidents.

Another area in which Brazil could undertake an *ex post* assessment of the mining regulation is on the overall management of risks to enhance safety beyond tailings dams. The assessment should allow for the identification of important aspects to fill voids and gaps in the issuance of new legal instruments, as well as the effective enforcement of existing rules. As denoted *by the OECD Recommendation on Regulatory Policy and Governance* (OECD, 2012[5]), the better regulation efforts in this area should comprise risk assessment, risk management, and risk communication strategies to the design and implementation of the regulations to ensure that they are targeted and cost-effective.

Establish mechanisms and actions that promote regulatory coherence between the federal government and the states to avoid gaps or overlaps in the regulation dealing with the environmental impact of tailing dams.

Promote the sharing and adoption amongst states of good examples of practices in the regulation dealing with the environmental impact of tailing dams.

Aim to complete the regulatory framework in order to consider mine closure as part of the mine's lifecycle and include tailing management in relation to the dismantling of tailings ponds after the closure of mine operations.

Regulation of small-scale mining activities and policies to deal with informal and illegal mining operations

Assessment

Issue 6: A specialised regulatory framework that promotes safety and environmental regulatory compliance for artisanal small-scale mining (ASM) in Brazil is still to be completed

Many safety and environmental standards for ASM operations are the same as those applicable to large mines, which are not necessarily adequate to deal with atomised operations spread across large areas of the Brazilian territory. Furthermore, enforcement strategies of safety standards in artisanal mining operations are not adequate to ensure regulatory compliance.

Although Brazil has specific rules for ASM concessions and title granting (Law No. 7.805/1989, Law No. 6.567/1978 and Decree No. 9.406/2018), it does not have explicit safety and environmental regulations to manage artisanal mining activities. The legislation in place is not orientated to prevent pollution nor reduces safety risks related to a mismanagement of the extraction of alluvial ores and the beneficiation of precious metals (e.g., gold), gems (e.g., diamonds), and aggregate materials for construction (Law No. 6.567/1978).

Additionally, in Brazil occupational health and work safety legislation does not cover *garimpeiros* (i.e., ore diggers, artisanal mining workers) as these are governed by a specific legislation and not by labour standards because *garimpeiros* are not considered employees. This situation causes distortion in work relations, leading to the occurrence of degrading work situations affecting social and environmental policy objectives.

Issue 7: Plans to promote the formalisation of garimpeiros that perform informal mining activities should be implemented and incentives for formalisation should be increased.

The Brazilian legislation does not define *informal mining*, which makes it difficult to deploy policies and budgetary resources to formalise *garimpeiros* that do not comply with some regulations. The term *informal mining* describes locally based and small-scale exploration and extraction activities of precious and base metals, precious stones, and gems, as well as construction aggregates that may not abide by all the legal formalities corresponding to a licensed mining activity.[22] The term “informal” denotes mining by individuals, groups and cooperatives that is carried out without the compliance of all formal regulations imposed by the State.[23]

In an attempt to formalise informal *garimpeiros*, the Congress passed Law No. 11.685/2008, which stipulates the rights and obligations of small miners. These comprise the requirements to recover the areas negatively affected by the mining activity, to comply with all labour safety and health regulations as well as to prevent child labour. However, according to the information provided during the stakeholders’ interviews, *garimpeiros* seem to face difficulties in having the necessary means to compensate the environmental damage caused by their operations, and thus they are unlikely to be eligible for an environmental licence, leaving them in the informality.

Additionally, the Ministry of Mines and Energy and ANM are working together in further efforts to formalise *garimpeiros*. These efforts comprise plans for the formalisation of small-scale miners in gold mining activities,[24] and in general mining activities.[25] The PMD also includes provisions to promote formalisation and encourage cooperatives in the mining activity; and to promote the adoption of good practices in gold mining.

Given the recent nature of these efforts, the challenge is to ensure implementation, carry out evaluation of their impact, and complement them with the right incentives to promote the compliance of legal regulations to protect the safety of miners and local communities, as well as to protect the environment from the damages of informal extraction activities.

Issue 8: Recent efforts to tackle illegal mining are encouraging, but they should lead to long-term sustained efforts

One of the current avenues to tackle illegal mining in Brazil is the creation and agenda of the National Council for the Legal Amazon, established by Decree No. 10.239/2020 under the co-ordination of the Vice President of the Republic.[26] Additionally, there are regular reports in the media of activities by the federal police informing of actions to tackle illegal mining. They comprise interdiction measures, such as the arrest of illegal miners and the destruction of mining equipment, amongst others.

The Brazilian authorities have also applied a combination of policies to deal with illegal mining extraction with some inter-sectoral articulation. This includes campaigns that ANM deploys to promote *mining cooperatives* among small miners. These cooperatives can induce the formalisation of small operations by creating a value chain around mineral processing, especially in the case of the extraction of aggregates, clay, gold, and diamonds.

These efforts are encouraging considering the expressions of concerns by the public opinion and the government regarding the adverse environmental impacts and criminal activities related to illegal mining.

Additionally, some stakeholders declared that there are cases in which large mining operations are conducted illegally, as they simulate to be operations performed by *garimpeiros*. A consistent policy to combat illegal mining is dependent on a successful policy of formalisation. Therefore, the efforts by the Brazilian government in this regard as discussed in the previous issue are welcomed.

These efforts are yet to be collected in a cross-sectoral cross-institutional articulated strategy to tackle illegal mining that leads to long-term sustained efforts. A key element for such efforts will be availability and access to better information and intelligence to combat effectively illegal miners. The current co-ordination actions by the MME, ANM, the Ministry of Defence and other public security bodies with the objective of obtaining access to satellite image data and generating information regarding the occurrence of illegal mineral extraction activities is a step in the right direction.

Recommendations

In the *ex post* assessment of mining regulation related to the management of risks, ensure that a risk-based approach for artisanal small-scale mining, including *garimperios*, is applied. The risk-based approach implies that rules and regulation should be proportional to the level of risks that the activities pose. The *ex post* assessment should help define whether the regulatory framework that promote safety and environmental protection is over or under regulating the risks that ASM and *garimpeiros* activities entail.

Consider complementary innovative approaches to seek the formalisation of *garimpeiros*. The reasons for informality in any economic activity are multidimensional, and therefore, the strategies to tackle informality should also be varied. Additional to ensuring the full implementation of the current government measures to diminish informality amongst *garimpeiros*, and to strive for a regulatory framework that is proportional to the risks *garimpeiro's* activities convey – which should lead to less burdensome regulations and hence contribute to less informality – Brazil should consider other innovative approaches. They may include approaches informed by the use of behavioural insights. The *OECD BASIC Toolkit: Tools and Ethics for Applied Behavioural Insights* can provide guidance for these efforts (OECD, 2019[6]).[27]

Develop a cross-sectoral and cross-institutional articulated strategy to tackle illegal mining, which should gather the recent initiatives in this respect. The use and exchange of data and intelligence, and the strong use of ICT tools, should be at the centre of this policy.

Evidence-based decision-making in the National Mining Agency

Assessment

> *Issue 9: The work culture inside the ANM is in the process of changing, although there are still many obstacles to overcome to embrace a full and effective culture of rule-making based on evidence and of good regulatory governance*

ANM was created through Law No. 13.575, published on December 2017, which extinguished the National Department of Mineral Production and replaced it with the National Mining Agency. The creation of the ANM responded to efforts by the Brazilian government to improve regulatory governance in the mining sector, amongst other objectives.

The law establishes clear provisions to install a culture of rule-making based on evidence and of good regulatory governance in the ANM. For instance, it obliges the ANM to conduct both stakeholder engagement activities and prepare a regulatory impact assessment when planning to take policy or regulatory decisions. It also sets obligations and responsibilities for ANM to increase transparency in administrative processes. The law also establishes provisions for the composition and decision-making mechanism of ANM´s board of directors. These provisions are consistent with principles and practices promoted by the OECD, such as the ones included in the 2012 Recommendation of the Council on Regulatory Policy and Governance (OECD, 2012[5]), on the Best Practice Principles for Regulatory Impact Assessment (OECD, 2020[7]) and on the Governance of Regulators (OECD, 2014[8]).

There is evidence that some of this culture is starting to take hold in the ANM. Stakeholders, including representatives from business organisations and officials from sub-national levels reported that they have experienced continuous and meaningful engagement with the ANM in the process of discussing policy and regulatory developments, which was not a common occurrence with the DNPM. ANM has also taken steps towards the implementation of RIA, which is now mandatory, by issuing a manual and conducting several analyses for selected regulations, including the publication of several RIAs.[28] Reforms and updates in some of the administrative processes have also been undertaken in order to simplify formalities and reduce burdens for companies and other users, mainly through the adoptions of ICT systems, such as the Digital Protocol. With the entry into force of the rules regarding the broadcasting of the Board of Directors meetings and the disclosure of agendas and minutes, there was a significant advance in terms of transparency in ANM compared to the previous scenario in DNPM.

These are steps in the right direction, but in order to ensure full implementation of an effective culture of rule-making based on evidence and of good regulatory governance, efforts need to be intensified. The use of RIA should be systematic in order to safeguard that ANM bases its decision on evidence and not in bureaucratic inertia or other biases. There is also space to increase independence of decision making by ANM's board. Burdensome and bureaucratic process are still common in the ANM. Decisive steps to simplify and digitise formalities should be taken (both issues are discussed further below).

In order to undertake these changes, the ANM faces a challenging environment: the need of budgetary resources, as well as intensification of capacity building and training of staff (these issues are also discussed further below). This should be part of a strategy by the Brazilian Government and the ANM to complete the required cultural change inside the agency.

Issue 10: ANM fails to collect and process data and information in an efficient and reliable manner, leading to little evidence-based decision-making

ANM relies on self-reported data from private agents to determine the level of risk of certain installations (e.g., tailings dams) and thus design the inspections and enforcement actions to follow. In some cases, mining companies have failed to submit accurate information and have declared a level of risk lower than the actual one. Using incorrect evidence to determine actions of regulatory delivery by the agency puts at great risk the credibility and transparency of the institution.

The agency has to verify the correctness of the information provided through *in situ* inspections, which leads to inefficiencies and delays in the processing of the data. *In situ* verifications of data are costly and difficult to carry out, as most of the mining operations in Brazil are located in areas distant from the state capitals where ANM's regional offices are situated and the agency has a sub-optimal number of inspectors. Regulated companies input data on dam safety, amongst other areas, which include mineral production, reserves modifications, royalties, investments, in the SIGBM, which influences the risk classification of each dam, and thus the probability of inspections by ANM.

On the other hand, the Agency inherited more than 10 different information systems from the former DNPM. The platforms are not interoperable, making it almost impossible to crosscheck data and hinders its processing and analysis. Moreover, despite the existing of legal framework that promotes data sharing across institutions of the public administration, this is not yet common. Although the Law of Regulatory Agencies (2019) encourages the exchange of information, it does not solve the issue in practice.

Recommendations

Engage with the staff to intensify the communication of the new working culture of ANM, foster feedback loops and collaboration across different areas of the Agency. As a first step, the main elements of the new working culture that ANM wishes to promote should be clearly identified. The promotion of the new elements should be accompanied by the creation of communication channels between high management and staff. Employees should be able to provide comments and receive feedback on the new working methods. This would help legitimate central management decisions and ease their implementation. Moreover, **foster collaboration across** different superintendences and regional units to enhance the exchange of capabilities and best practices at the inside of ANM. An environment that acknowledges the success of the Agency as a whole and not necessarily on that of individual administrative areas could support the latter.

Stimulate the systematic use of data in the regulatory process. Employees from all levels, but particularly managers, should stand behind ANM's new working culture in which data drive decisions. Clearly communicate the benefits of evidence-based decision-making and provide staff with the necessary inputs to utilise data and information efficiently. It is particularly important that officials use data throughout the entire regulatory cycle and constantly improve regulations and their delivery. Iteration is fundamental. For this task, a mapping of the core processes in ANM for the delivery of regulation (i.e., granting of licences and other processes for mining companies and regulated entities), the database employed, and the needs for interoperability should be carried out.

Embed RIA in the decision-making process and define a clear governance for it. Currently, the Board of Directors is responsible for assessing the content of the RIAs and makes decisions based on them. Transparency in the allocation of responsibilities and clear expectations should underpin ANM's efforts to instil the use of RIA. Clearly define standards and requirements for the preparation of the impact analyses and offer training such that staff have the necessary resources. During the introduction phase of RIA, management and leaders inside ANM should work proactively with the technical areas performing the RIAs to highlight the benefits of this tool and avoid the perception that it represents additional bureaucracy.

Regarding the application of RIA, limit the number of exceptions and in cases where RIA can be skipped due to emergencies, carry out an *ex post* evaluation to assess if the regulation attains its objectives.

Publish specific standards and reporting obligations by mining operators and put in place the right incentives to ensure that data are accurate. Make publicly available, when possible, data collected by the Agency. Information should be published in friendly and accessible formats that facilitate external scrutiny and foster transparency.

Resourcing

Assessment

Issue 11: ANM's financial independence is compromised by the lack of adequate funding schemes and discretionary measures by the Federal Administration

ANM's level of funding is inadequate given its responsibilities and limits its ability to function efficiently and to achieve its objectives. At the time of creation of the ANM, it was agreed that the agency would be established with zero cost for the administration. This meant that it would inherit the structure and budget of its predecessor, the National Department of Mineral Production, which was part of the Ministry of Mines and Energy. Although the political and economic context in Brazil at the time dictated the starting conditions for the new regulator, it is important to highlight that a strong regulatory agency requires clear, efficient and simple funding schemes to discharge its duties effectively (OECD, 2014[8]).

Regulated mining agents in Brazil are subject to a mining royalty (CFEM), which the ANM collects and distributes according to the criteria defined in the Law No. 13.540/2017. ANM transfers 90% of the royalties to those sub-national governments where the mining activity takes place or that are affected by it[29] (e.g. have infrastructure used for the transportation of mineral substances). The remaining 10% goes to the Federal Government, which allocates the funds across federal institutions. The Ministry of Economy is responsible for transferring the resources to the ANM, which should account to 7% of the mining royalties. However, since the creation of the new regulatory agency, the Federal Administration has failed to transfer the full amount of funds and has capped the budget to approximately 3% of the total CFEM collected. In addition, the discretionary budget of the ANM can be limited further by the Federal administration, which curtails the ability of the regulator to operate efficiently and effectively.

Consistent with a broader fiscal policy applied by the Brazilian government, further cuts to ANM budget were applied recently. During 2019, the Federal government allocated approximately 41% of the ANM's budget to the Government's Contingency Reserve, an emergency fund for fiscal balance. This move further limited the capacity by ANM to comply with its duties.

The severe financial restrictions that the ANM face affect its regulatory functions, as certain inspections and regulatory enforcement activities seem hindered by the need to prioritise processes. After the tailings dams' accidents of Mariana (2015) and Brumadinho (2019), investigation reports pointed out to the chronical lack of financial resources of the ANM – and previously of the DNPM – as an important element preventing the mining regulator from discharging its functions properly. Nonetheless, the agency's budget seems to decrease steadily, meaning that it is hard to undertake multi-year projects, given the financial uncertainty and instability.

Moreover, the agency has arrived at the the point of relying in other sources of financing, such as donations and public-private partnerships, to acquire software and technological equipment. The intensification of this type of funding from sources with conflict of interests may lead to reputational and capture risks.

Issue 12: ANM has significant staff restrictions that limit its ability to fulfil its responsibilities

ANM's human resources structure is not adequate to fulfil all of the agency's attributions, hampering the performance of the regulator. ANM's mandate is broader than that of the former DNPM, which makes the staff limitations even more acute. For instance, ANM cannot fulfil its duty in matters regarding economic competition and antitrust in the mining industry because it lacks staff with the relevant expertise. Similarly, one of the most important responsibilities centres on regulatory enforcement and inspection, yet limitations in staff number and capacities of the existing personnel obstruct an effective performance in this area. Even though the agency recognises the importance of training and capacity building for its staff members, it cannot offer enough capacity building programmes due to financial restrictions.

In 2010 took place the latest exam to join the DNPM as public servant, limiting the influx of new officials to the ANM, which has had to rely on staff moving from other regulatory agencies to fill in some of the gaps.[30] The Federal government has restricted even further the possibility of carrying out public service exams in the face of the current economic situation, making it practically impossible for the agency to attract new civil servants in the near future. Adding to the absence of new employees, a significant proportion (38%) of the current workforce is close to retirement, with the average age at the ANM being 56 years old. Several stakeholders showed their concerned about the potential scenario in which the ANM will not be able to replace the staff that retires, aggravating even more the situation.

Furthermore, the compensation scheme for those working at the ANM is not attractive. In comparison with the private sector and to other regulatory agencies in Brazil, wages at the Agency are not competitive, leading to high turnover rates and demotivated workers.

The agency requires a strong training programme for its workers, as the mining sector is particularly technical, entails high-risk activities and involves very diverse stakeholders. However, the ANM has been forced to postpone or cancel capacity-building activities in light of the financial restrictions. This point is particularly sensitive for staff located in ANM's regional offices across the country, who deal directly with miners and mining operations but that many times do not have the necessary inputs to manage processes in the most efficient and adequate way.

Recommendations

Advocate for the advancement of ANM's financial independence by promoting for an increase in the financial resources allocated to the Agency. The medium-term objective should be to reduce and eventually eliminate the gap between what Law No. 13.540/2017 establishes in financial resources for the Agency, and what it actually receives. Engage with the Ministry of Mines and Energy, the Ministry of Economy and Casa Civil to define high-level compromises that ensure a smooth and complete transfer of the budget to ANM. Even if a share of regulatory agencies' budget is allocated to the National Contingency Reserve, in the case of ANM this proportion (approximately 41% in 2019) is somewhat disproportionate. Although ANM has independence in the way it manages its resources, uncertainty regarding the amount of funding that the Agency will actually be granted through the Annual Budget Law limits ANM's performance.

The increase in budget should be accompanied by larger levels of transparency and accountability to the public. ANM could benefit from providing information that is clear and easily accessible regarding the way it uses its financial resources. Aligning ANM's budget execution with its objectives and publishing information on the subject offers continuous monitoring, and thus feedback on the way ANM carrying out its duties. Moreover, the latter could increase society's trust in the work of the Agency.

Make certain that ANM has the adequate number of staff with the appropriate expertise and competences to fulfil all of the Agency's obligations. ANM's current restructuring should explicitly consider the Agency's needs of skills and capabilities (e.g., expertise on economic competition and antitrust) and it should factor-in the restrictions by the Federal government for new hires. While the

increased use of ICT tools should make certain processes more efficient, specific tasks require personnel with a defined set of capabilities. The Ministry of Mines and Energy, the Agency and Casa Civil could engage to assess all the alternatives available to fill the gaps in terms of human resources and ensure that the Agency has all the necessary conditions in place to discharge its duties. This assessment should also consider the staff needs in the face of workforce retirement plans.

The National School of Public Administration (*Escola Nacional de Administracao Pública, ENAP*) can be an important ally for the ANM for its capacity development needs. ENAP not only has the infrastructure in place to offer trainings and courses, but also has a leadership competency model that builds on international practices and is transversal to the public sector

Carry out a benchmark study of compensations scheme for officials of the National Mining Agency vis-a-vis other regulatory agencies and private companies in Brazil to identify levelling needs. Such a study could help ANM improve employee benefits to attract better-qualified applicants and to reduce the turnover rates in the agency. Professionals working at the ANM could be further motivated by having the same compensation and benefit structure as its peers in other regulatory agencies or in private companies. This would be a driver for higher productivity.

Stakeholder engagement

Assessment

Issue 13: Important stakeholders from the public sector in the mining industry have not fully embraced the new attributions and scope of action of the ANM

Stakeholders have taken some time to adapt and respect the new independence and role of ANM. The creation of the agency changed the regulatory landscape of the mining sector in Brazil significantly. Adjustments go from the way the agency interacts with its stakeholders, the responsibilities that it has as an independent regulator to the approach that it follows in terms of internal management. Additionally, ANM's mandate includes overlaps with that of other regulatory agencies and sub-national authorities, generating the need for co-ordination and co-operation to avoid duplications and inefficiencies.

Although the new regulatory and institutional arrangement of the mining sector in Brazil grants ANM independence in its decisions and in the way it manages financial and human resources, relevant stakeholders have yet to embrace the changes fully. The transition from the former National Department of Mineral Production to the newly created National Mining Agency changed the institutional context of the mining sector in Brazil significantly. The DNPM was an administrative area linked the Ministry of Mines and Energy and as such, it had limited independence and decision-making powers. The current relationship between the MME and ANM seems to show some inertia in terms of the former subordination of the DNPM to the MME.

ANM's regional offices struggle to accept the new governing structure of the agency. Under the DNPM, ANM's 25 regional offices operated in an autonomous way, even if administratively they were under the central management hierarchy. This *de facto* autonomy led to the politicisation of the regional units, which contravenes the agency's attributions. Additionally, each office interprets the regulations differently, even if the mining laws are federal. To a certain extent, regional offices are yet to adapt fully to the governance and decisions-making arrangements at ANM headquarters, especially considering the collegiate board of directors and the standardisation of processes.

Issue 14: Co-ordination across Brazilian institutions involved in the regulation of environmental and safety standards in the mining industry should be strengthened, with a focus to reduce burdens for businesses and increase the effectiveness of the policies

There is a complex web of environmental and safety regulations at the state and federal levels with regards to mining activities. This situation might hinder the application of effective policies to manage safety risks and regulate the pollution generated by the extraction of minerals, while generating excessive burdens to businesses.

For example, state environmental regulators deploy enforcement activities that added to those conducted at the federal level by IBAMA and ANM, represent an excess of resources invested by both the government and business. Large burdens for enterprises resulting from aggregated layers of state and federal regulations in safety and environmental aspects also complicate the development of mining projects. According to reports by some stakeholders, installing a mine in Brazil involves large administrative burdens and long periods of development—up to 10 years.

Although both ANM and IBAMA have discussed elements of administrative simplification, co-ordination between both agencies is not systematic yet. Likewise, there is no evidence of systematic co-ordination between ANM and environmental regulators at state level. The level of co-ordination between ANM and the Special Secretariat for Social Security and Labour remains to be ascertained.

Co-ordination among ANM and the institutions involved in safety and environmental regulation in the mining industry is difficult, despite the existence of some provisions in the regulatory framework to promote it.[31] The lack of collaboration obstructs the deployment of effective policies to guarantee high levels of safety compliance, the protection of environmental assets, mining workers, and local communities impacted by the mining activities.

Recommendations

Communicate ANM's role and attributions to relevant stakeholders and to the public. This could be done through information campaigns, better definition of responsibilities and engagement with representatives of specific groups and communities around the country. Moreover, the Agency could **elaborate materials that clearly state ANM's scope of action** specifically for those topics where functions may overlap with those of other institutions (e.g., labour, health, environment, state's regulation).

Bring regional managers on board. By understanding the needs and conditions in ANM's regional units, it would be easier for the Board of Directors and central unit to adjust requirements to the reality of local offices. Explain the rationale behind decisions made at the central level and share with regional units guidelines with best practices, checklists and clear requirements to ensure the smooth and standard implementation of regulations.

Promote regulatory coherence in the mining legal framework between the federal government and the states, and in the promotion of good regulatory practices, place special attention to issues on environmental licensing. These mechanisms should include mapping all the processes—federal, state and municipal—that mining companies have to undergo to start activities, and that have to comply during the operation. Using methodologies such as the standard cost model,[32] measure the burdens to identify opportunities for administrative simplification using digital licensing and other alternatives, such as one-stop shops proposed by the *OECD Best Practice Principles for Regulatory Policy: One-Stop Shops for Citizens and Businesses*[33] (OECD, 2020[9]). The identification and sharing of good practices at regional level should contribute to achieve aggregate streamlined process for regulated parties in the mining sector.

Define clear steps and milestones to ensure effective co-ordination with entities that play a role in the mining sector. Formalise and implement co-operation agreements that grant the necessary legal, technological and financial conditions to exchange data among IBAMA, the Federal Reserve of Brazil, the

Special Secretariat for Social Security and Labour and state environmental agencies. Take advantage of the National Infrastructure of Open Data (dados.gov.br) and ensure that data is uploaded in adequate formats, updated regularly and used to inform decisions. Develop joint protocols for inspections and exchange information on compliance levels to better target interventions

Inspections and regulatory enforcement activities

Assessment

Issue 15: Inspections and enforcement activities could be improved significantly

ANM's enforcement and inspection activities during the lifecycle of a mine are insufficient. The accidents of Mariana (2015) and Brumadinho (2019) re-defined the allocation of resources and prioritised the inspections of tailings dams. However, human and technological resources remain insufficient, limiting the ability of ANM to comply with all of its enforcement responsibilities. Additionally, co-ordination with other regulatory agencies and institutions engaged in mining regulation is not adequate to foster an efficient regulatory delivery.

ANM prioritises the inspection and enforcement of tailings dams' safety standards. Currently, the SIGBM includes information on 862 dams in the country, out of which 436 are part of the National Policy for Dams Safety, meaning that they are under more intensive surveillance regimes. Dams are inspected according to resource availability and following criteria set up in the corresponding regulation, which include technical aspects of the dams, type of stored materials, potential environmental damage, amongst other criteria.

ANM still faces meaningful restrictions in terms of staff with the technical capacities to carry out *in situ* verifications of the dams, despite the recent efforts to address this shortfall.[34] Inspections are limited further by the size of the country, the location of the mining operations and travelling costs for the officials. Moreover, ANM's regional offices lack technological equipment to perform inspections remotely, meaning that for every inspection ANM deploys at least two inspectors. The agency strives to focus the visits to dams identified with the highest level of risk; however, in 2019 it managed to inspect only 51% of the dams planned due to lack of staff (Agência Nacional de Mineração, 2019[10]).

Additionally, ANM's personnel usually verifies prospecting activities before the agency can grant an exploration permit. Despite the fact that pre-market verifications are not legally compulsory, ANM officials at the regional office have the discretion to carry them out. However, ANM considers prospecting activities as a low-risk operation that should not require a physical inspection. Therefore, the agency is preparing changes to eliminate the inspection for the prospecting phase altogether. ANM is conscious of the deficiencies in the inspection and enforcement processes. Despite this acknowledgment, the agency has included the topic as one of the strategic projects to carry out in 2022 (Agência Nacional de Mineração, 2020[11]).

It seems that several laws for artisanal small-scale mining activities are not enforced meaningfully, (Sousa et al., 2011[12]). Supervisory actions to promote the compliance of safety standards and the implementation of pollution control measures in small mining operations are inefficient due to the overlaps between ANM and the state environmental regulators.

Co-ordination with other regulatory agencies and inspection authorities remains low. ANM shares its inspection and enforcement responsibilities with environment, health and labour entities, many of which include state level authorities, but clear definition of responsibilities and effective coordination mechanisms remains challenging. Additionally, the agency verifies compliance of financial regulations and the payment of the CFEM. Nonetheless, data exchanges and joint inspections are rare, despite a few positive experiences mentioned by stakeholders.

Recommendations

Develop and implement a detailed and articulated policy on regulatory enforcement and inspections for the mining sector, in which the main elements should include inspections based on evidence, inspections based on risks, co-ordinated efforts across federal agencies and sub-national governments, intensive use of ICT, and a well-resourced programme on inspections. To develop this policy and carry out its implementation, the *OECD Toolkit on Regulatory Enforcement and Inspections* can be employed as guidance (OECD, 2018[13]).[35] This policy should comprise not only the responsibilities in enforcement and inspection in the mining sector by the central offices of ANM, but also their regional offices. It should also include the enforcement and inspections actions of other ministries and agencies at both national and sub-national level.

As part of this policy, inspections should be carried out only where there is evidence that they reduce the associated risks. Inspections based on evidence means that scarce public resources – which include the time of inspectors – should be invested in activities that will return a public benefit, in this case a real reduction of risks of accidents or other damages. Laws and secondary regulations, as well as discretionary practices by central and regional offices at ANM should be well aligned with these criteria.

In this policy, define inspections and enforcement plans that consider the risks associated to each operation and ensures the proportional allocation of resources. ANM would benefit of having a clear understanding of the risks in mining activities and plan inspections and enforcement activities accordingly. In order to ensure better adoption and application of these concepts, specific guidelines and an inspection manual are key elements. In this context, a greater share of inspections that ANM performs during the year would be proactive and targeted to activities or installations that present the greater level of risk. Additionally, ANM could prepare guidance on enforcement actions following a risk-based approach to accompany the inspections manual mentioned above. In this way, scarce public resources will be targeted more effectively. Finally, stakeholders should be made aware of this methodology and expectations should be aligned among the regulator, the regulated parties and the public.

Collect information from inspectors: they are the ones on the ground and have valuable insights. ANM should foster feedback loops, where the agency collects information and comments from inspectors to improve the way inspections and regulatory enforcement actions are carried out. This will help re-inforce the criteria of inspections based on evidence, and will help to build risk-profiles to strengthen the objective of inspections based on risks.

As part this policy, establish formal mechanism to implement, oversee and carry out inspections in the mining sector that include all national and sub-national agencies with a stake in the sector. For instance, at national level this should include the regional offices of ANM as well as the authorities in charge of labour safety and hygiene. At sub-national level this should include regional and local offices on environmental protection. Co-ordinated inspections will reduce burdens for regulated entities, improve perception amongst the public, save public resources, and make the reductions of risks of more effective.

The use of ICT systems will be fundamental to apply a successful policy of inspections based on evidence and based on risks, and establish well-coordinated systems. ICT systems will allow for the processing and sharing of data, which will help assess and define what to inspect, when to do it and by whom. ICT systems will be fundamental for the construction of risk profiles of regulated entities and to assess the impact of the inspections. Inter-operability of databases will facilitate the co-ordination of inspections between agencies at all levels of government and will help in better planning. Besides the deployment of ICT solutions, it is important that agencies that perform enforcement and inspection activities of mining operations integrate and co-ordinate their tasks to avoid duplications and improve a more efficient use of resources. Approaches such as the delegation of functions and the systematic exchange of information and inspections' results can help reduce administrative burdens while increasing regulatory compliance.

Ensure proper resources for the policy on regulatory enforcement and inspections for the mining sector. An effective application of the principles of inspections based on evidence, inspections based on risks, co-ordination and intensive use of ICT should result in efficiencies in budgetary needs, which should be covered fully for an effective implementation of the overall policy.

Consider regulatory enforcement strategies beyond the command-and-control approach. ANM could benefit from having in place diverse interventions aimed at improving enforcement and compliance. They can build on the specificities of the sector, and in particular on the characteristics of given regulated entities. For instance, the provision of guidance materials and information campaigns on how to comply with the regulation, might be more effective than putting sanctions on certain mining operators. Additionally, the use of behavioural insights or the introduction of performance-based regulation could enhance the sector's performance. The *OECD BASIC Toolkit: Tools and Ethics for Applied Behavioural Insights* can provide guidance for these efforts (OECD, 2019[6]).[36]

Administrative simplification and burden reduction

Assessment

> *Issue 16: Additional efforts are needed to simplify the licences, permits and authorisations to start and carry out mining operations.*

One of the most common complaints by a large number of stakeholders is the heavy burdens that the government administrative process generates for business on the mining sector, especially to initiate operations. According to stakeholders, the consolidated process to obtain all the necessary licences and permits from the several involved agencies at national and sub-national level, and undergo all the necessary pre-market inspections and assessment, could take up to 10 years. The government's objective to boost the growth of mining activity might be at risk if this heavy bureaucracy is not tackled.

ANM has engaged in important efforts for the simplification of processes linked to the mining exploration and concession regimens under their remit;[37] however, significant delays remain, and the agency has a backlog of over 20,000 files. Although ANM inherited many of these files from the former DNPM, the regulatory framework, the lack of technological equipment to carry out remote inspections and the subjectivity on the approval process limit the solutions available to tackle the problem.

The burdens for businesses from the administrative processes in mining regulation are compounded by the practice of pre-market inspections. For instance, before it can grant exploration permits, ANM's regional offices usually carry out *in situ* inspections of the area where prospecting activities will take place, despite the fact that they are not compulsory but under discretion or ANM´s regional offices. This a can generate important delays, given the dimensions and location of the mining operations in the country. Even if the law would allow the agency to carry out remote inspections, ANM does not have the technical equipment to perform them. Additionally, the process for approval of these permits varies according to the person assessing the information, leading to uncertainty and slow processes.

One area in which the ANM has made progress is the digitisation and simplification of procedures according to the level of risk of the projects. The agency introduced a fast-track process for low risk activities in which it grants in 34 days the permission for mineral exploration. This scheme relies on the accuracy of the information declared by the requesting party and defines administrative and financial sanctions in case of false declarations. Currently this process is only available for the exploration phase, but there are plans in place to expand it to the concession phase. These efforts should be stepped up.

ANM has taken steps to speed up the digitalisation of its administrative procedures. The *Protocolo Digital*, a digital one-stop shop, offers the regulated parties the opportunity to submit their documents and reports online without going to ANM's regional offices. This has reduced the burden that mining operators face to comply with the regulation and has allowed several of ANM's processes to continue even during the COVID-19 pandemic. There are initial efforts to co-ordinate with sub-national authorities to streamline licences at these levels of government.[38] However, the ANM and the MME do not have a mapping of all the government formalities, processes and inspections that enterprises in the mining sector have to comply with from all relevant agencies at federal, state and local level. This exercise, and the measurement of the related burdens, should be the starting point to take decisive and deeper efforts on administrative simplification in the regulation of the mining sector in Brazil.

Issue 17: However, several obstacles complicate the progress of the simplification and digitisation agenda of the ANM, including financial constraints and lack of adoption of new tools

ANM is facing several obstacles that hinders its better regulation efforts, specifically in the area of simplification and digitisation of processes. ANM is deploying ICT tools to improve the management of administrative procedures and generate evidence and intelligence for the mining industry. The agency inherited approximately 14 different systems that are not interoperable and that generate burdens in terms of internal processes, and that have a negative impact in the processes for granting licences and permits as well as in inspection activities. ANM has realised that to address this situation it requires platforms that ensure better data processing and that allow the streamlining of procedures

However, two important elements hinder this deployment, the lack of resources to acquire software and the resistance by a portion of the agency's staff to use new tools. ANM has relied on alternative ways of funding such as donations or collaboration agreements with the private sector to access digital tools. Furthermore, an under adoption of the existing ICT alternatives available at the agency restricts the benefits of more systematised structures and data management. For instance, some officials rely on colleagues to input into the system data collected, as they are not comfortable using digital technologies.

Additionally, most of ANM's regional offices interpret and apply regulations differently which leads to a lack of standardised processes and procedures, generating burdens for the regulated parties and fostering subjective decision-making. This heterogeneity increases administrative costs and reduces the incentives for compliance. Moreover, the divergence in process management can foster two opposite outcomes. Either a race to the bottom, where the application of regulatory requirements is reduced to the minimum or, on the other extreme, create a barrier to entry/operation of mining activities. In both scenarios, private operators need to allocate time and resources to understanding the different regulatory requirements in each state, leading to inefficiencies. Regional offices are usually the contact point between regulated agents and the regulator, and as such they shape much of the perception that citizens and businesses have of the regulatory agency (OECD, 2010[14]).

Issue 18: The Law of Economic Freedom establishes provisions to streamline government processes to benefit citizens and businesses; ANM could leverage on these elements to boost its simplification strategy

The Law of Economic Freedom was published in September 2019.[39] Its main objective is to "set forth standards protecting free initiative and the free conduction of economic operations as well as provisions on the Government's actions as a normative and regulatory agent".[40]

Hence, the Law of Economic Freedom establishes provisions aimed at streamlining government processes and formalities, with the intention to benefit citizens and businesses by reducing the burdens and other costs that the regulation creates. Two of these measures include defining a group of low-risk economic

activities that will be free of any kind of government licence or permits to start or continue operations,[41] and the instituting of the "silent-is-consent" rule in government formalities,[42] with specific caveats and exemptions.

According to the Law, the agencies of the Executive Power should issue the classification of low-risk activities, which will be exempted of licences and permits,[43] The ANM has started work on this list, but it has not been finished, nor it has been issued publicly.

The "silent-is-consent" rule means that applications for licences and permits, and other formalities, obtain a tacit approval in case the government agency does not provide an official response in the legally defined allocated time to do so. The Law of Economic Freedom establishes that this rule will apply, "except in cases expressly prohibited under law".[44] The Mining Code, which regulates the granting of concessions and licences on mining activities, contains provisions that rule out the "silent-is-consent" provision.

To boost its simplification strategy, the ANM could leverage on these elements to boost its simplification strategy. It could consider proposing further reforms to the legal framework on mining activities to allow for specific cases in which the "silent-is-consent" rule would apply, following a criterion of weighing the risk represented by these cases.[45] Currently, exploration activities are considered to be of low-risk by the ANM. Yet, pre-market inspections are still required in order to bestow exploitation concessions.

Recommendations

Develop and implement a detailed and articulated policy on administrative simplification and burden reduction for all government formalities in the mining sector. This policy should lead to mapping all administrative procedures that mining operators need to comply with for each of the mining regimes, covering all the federal ministries and agencies involved, as well as the procedures from sub-national governments. This exercise requires a joint effort across institutions (e.g., IBAMA, ANM, the Special Secretariat for Social Security and Labour, state environmental agencies, among others) to assess all the possible user journeys and identify pain points, eliminate repeated requirements, overlaps and apply simplification actions. Streamline processes before moving to the digitalisation phase to avoid the digitising bureaucracy and inefficiencies. The use of the "silent-is-consent" rule could be extended to lower-risk activities. One option to be considered is the creation of a one-stop shop for mining formalities. The *OECD The OECD Best Practice Principles for Regulatory Policy: One-Stop Shops for Citizens and Business* (OECD, 2020[9]) could help in this exercise.

In this policy, prioritise the digital licencing efforts. Digitalisation of all administrative processes available cannot and should not be done all at once. Prioritise those processes that generate the greatest administrative burdens[46] and streamline both the front and the backoffice. Generally, 20% of the formalities represent approximately 80% of the administrative burden, which is why it is important to devote resources to the identification of those critical processes.

Keep in mind the public policy objective when reducing administrative burdens. Given the risks and complexities inherent to the mining sector, careful attention should be paid to simplification activities, including the use of the "silent-is-consent" rule. Although the elimination of regulatory barriers is welcome, when adequate, it should be accompanied by an *ex post* evaluation or risk assessment of the regulations that are being modified or derogated. Bear in mind the public policy objectives (e.g., protect human health, ensure certain environmental outcomes) and enact reforms that do not jeopardise their achievement.

Reduce transaction costs by providing guidelines on implementation and interpretation of regulations to regional units and to stakeholders. Elaborate clear, easily understandable and accessible documents for regional staff on the way regulations should be interpreted and applied. Constantly engage with regional managers to share good practices and collect feedback on the difficulties of applying regulations on the ground. Moreover, ANM could consult with mining operators from across the country to assess whether differences in the implementation of the legislation persist.

Notes

[1] This does not preclude the fact that many other legal instruments pertaining to the broad regulatory framework on mining activities have been issued or amended.

[2] At the time of preparing this report, ANM informed that its 2020/2021 Regulatory Agenda includes the preparation of draft regulations to tackle issues on reserve/deposit and mining closure. These draft regulations have been submitted to stakeholders for comments, and regulation 68/2021 on mining closure was published on 30 April 2021.

[3] This is not an exhaustive description of all the legal instruments related to safety in tailing dams in Brazil. The full draft report to be available soon will encompass a more developed list.

[4] This Ordinance revised the standards already issued for dam safety regulations: DNPM Ordinances No. 416/2012 and No. 526/2013.

[5] Available at https://www.gov.br/anm/pt-br/assuntos/acesso-a-sistemas/sigbm (accessed 10 April 2020).

[6] Available at https://app.anm.gov.br/sigbm/publico (accessed 23 March 2021).

[7] See for further details https://www.metalbulletin.com/Article/3858914/Upstream-tailings-dams-banned-in-Brazil-following-Vale-incident.html (accessed 25 February 2020).

[8] It is worth noting, however, that these countries have peculiarities related to the incidence of high-intensity seismic shocks, which does not occur in Brazil.

[9] Available at https://www.in.gov.br/en/web/dou/-/lei-n-14.066-de-30-de-setembro-de-2020-280529982 (accessed 13 December 2020).

[10] This legislation establishes the regulation of safety actions to be adopted in the planning, design, construction, first filling and first pouring phases, operation, deactivation, de-characterisation, and future uses of dams.

[11] To support this measure, ANM issued Resolution No. 51/2020 to establish the “Conformity and Operational Assessment of The Emergency Action Plans”. Under this regulation, a mining companies are required to annually execute, for each of its tailing’s dams, a comprehensive evaluation to check whether the dams comply with current safety standards to operate. Available at https://www.in.gov.br/web/dou/-/resolucao-n-51-de-24-de-dezembro-de-2020-296821959 (accessed 22 February 2021).

[12] The self-rescue zone (or ZAS for its acronym in Portuguese) stretch of the valley downstream of the dam in which there is not enough time for the competent authority to intervene in an emergency, according to the flood map.

[13] Recently, ANM published Resolution Nº 51/2020 that deals with the “conformity assessment and operation declaration” of the PAEBM. Available at https://www.in.gov.br/web/dou/-/resolucao-n-51-de-24-de-dezembro-de-2020-296821959 (accessed 22 February 2021).

[14] Recent efforts include expanding temporarily the number of safety technicians focused on inspectors, through the publication of Inter-ministerial Ordinance No. 23.478 / 2020 ME-MME on 27 January 2021.

[15] The State of Minas Gerais, the main mining state in Brazil, published Law No. 23.291 on 22 February 2019 establishing the "State Dam Safety Law." Article 6o of this Law establishes that the construction, installation, operation, expansion and raising of dams in the State depend on prior environmental licensing

[16] The system of environmental licensing at state level has challenges of its own that should be addressed. A study concerning the licensing practices in the four south-eastern states (Minas Gerais, São Paulo, Rio de Janeiro, and Espírito Santo) identified that some phases of the environmental licensing procedure are frequently omitted. This is a result of reclassification of potential impacts caused by projects from "intense" to "moderate" or "minimum", which exempts the project from a full impact assessment study (OECD, 2021[16])

[17] At the time of preparing the report, ANM just finished the consultation process and the draft regulation *Use of Sterile and Tailings Dams*, which is part of ANM´s regulatory agenda for 2020/21. The draft regulation has been submitted for legal analysis before its approval by ANM's Board of Directors.

[18] It is important to highlight that this law has also amended Article 43-A of the Mining Code establishing that the recovery of the degraded environment foreseen in a mining project should include, among others, the closure of the mine and the decommissioning of all installations, including tailings dams, in accordance with the current legislation.

[19] Regulations considered in this category include the following critical issues: soil mechanics, rocks mechanics, slope stability (specially in open pits), ground control (e.g., design of rock bolting reinforcement, shotcrete, floor stability, determination of pillar strength in underground mines), geomechanics instrumentation, mine subsidence, sustaining activities for underground mines, safety standards for mining refuge for workers.

[20] Available at https://www.oecd.org/gov/regulatory-policy/public-consultation-best-practice-principles-on-stakeholder-engagement.htm.

[21] Available at http://www.oecd.org/gov/regulatory-policy/reviewing-the-stock-of-regulation-1a8f33bc-en.htm

[22] The term "small-scale mining" denotes a series of small-scale activities such as digging, marking, panning, and shovelling, leading to the extraction of minerals.

[23] In this report, informal mining is considered to have the following attributes: 1) it has a reliance on physical labour for all types of operations, making minimal use of technology; 2) it may lack of complete legal mining licences, titles, leases and claims to the mineral areas for exploratory and extractive activities; 3) it exhibits low levels of productivity per mining operation, resulting from relatively small geographical areas; 4) it has low levels of health and environmental safety for miners, workers and local communities; and 5) it exhibits a transient character of employment due to the seasonal dependence of mining. This kind of mining remains in the informality with the express intention of staying on the margin of legality and hence avoid the costs and controls imposed by the State (Kunamoto, 2001[15]).

[24] SGM Ordinance No. 108, of 11 July 2019 led to the creation of a working group between the MME which resulted in a report with recommendations to give greater support to the formalisation of gold mining activities. Additionally, ANM established a task force as a pilot program to regularise the gold mining in the region of Tapajós, with plans to extend it to other regions that face the similar situations.

[25] Through Decrees No. 108/SGM of 11 July 2019 and 109/SGM of 18 July 2019, a specific working group was created culminating in the elaboration of a broad diagnostic study, whose recommendations include the improvement of the norms related to mining and environmental protection

[26] Available at https://www.in.gov.br/en/web/dou/-/decreto-n-10.239-de-11-de-fevereiro-de-2020-242820142 (accessed 24 February 2021).

[27] Available at http://www.oecd.org/gov/regulatory-policy/tools-and-ethics-for-applied-behavioural-insights-the-basic-toolkit-9ea76a8f-en.htm.

[28] Avaialble in: https://www.gov.br/anm/pt-br/assuntos/regulacao/analise-do-impacto-regulatorio-aira (accessed 11 January 2021)

[29] Mining royalties are distributed in the following way: 60% for the municipality where the activity or production takes place, 15% for the state where the production is located, 15% for the municipalities affected and 10% for the federal government.

[30] A recent exception include the publication by ANM of Public Notice No. 01/2021 with the opening of a selection process for hiring temporarily professionals to perform technical activities of management and engineering in the dam safety area.

[31] The law of Regulatory Agencies encourages collaboration and co-ordination across reg. agencies

[32] Available at https://www.oecd.org/regreform/regulatory-policy/34227698.pdf.

[33] Available at http://www.oecd.org/gov/regulatory-policy/one-stop-shops-for-citizens-and-business-b0b0924e-en.htm.

[34] The MME published Ordinance No. 138/2019 (Annex B – B.2), which established the Technical Committee for the Monitoring of Mining Dam Safety - CTBMin, and published, in jointly with the Ministry of Economy, Interministerial Ordinance No. 23.478 / 2020 (Annex B – B.3), which authorised ANM to hire, for a determined time, 40 (forty) new inspectors by ANM to act in dam safety.

[35] Available at http://www.oecd.org/gov/regulatory-policy/oecd-regulatory-enforcement-and-inspections-toolkit-9789264303959-en.htm.

[36] Available at http://www.oecd.org/gov/regulatory-policy/tools-and-ethics-for-applied-behavioural-insights-the-basic-toolkit-9ea76a8f-en.htm.

[37] For instance, MME Ordinance No. 136 of 26 August 2019, created a Working Group with the participation of MME and ANM, in order to identify the main bottlenecks and propose measures to reduce burdens and decrease the average granting time, part of which are in the implementation phase. In addition, in order to mitigate the effects of the COVID-19 pandemic and promote the improvement of the business environment, ANM created the Lavra Plan, materialised in a series of actions with the objective of reducing the bureaucracy between the Agency and the and whose benefits will extend beyond the pandemic.

[38] Decree No. 10.389 / 2020, the Pro-Minerals Decree, aims at greater interaction between government agencies in order to streamline environmental authorisations that make mining grants feasible in some specific situations, such as minerals of strategic interest to the country. Additionally, ANM published on 18 February 2021 Resolution No. 59 that stablishes the parameters for mutual technical co-operation agreement with states and municipalities to assist ANM in mining inspections and monitoring.

[39] Law No. 13,874 published on 20 September 2019 which "institutes the Declaration of Economic Freedom Rights; it establishes free-market guarantees, and amends other laws and decrees.

[40] Article 1.

[41] Article 1, paragraph § 6, and Article 3, section I.

[42] Article 3, section IX.

[43] Article 3, paragraph § 1, section I.

[44] Article 3, section IX.

[45] ANM published resolution No. 22/2020, which foresees the tacit approval procedure for certain acts, such as exploration authorisation.

[46] It this context, it means those processes that have the greatest cost and are done the most.

References

Agência Nacional de Mineração (2020), *Planejamento Estratégico ANM 2020-2023*, http://antigo.anm.gov.br/portal/acesso-a-informacao/acoes-e-programas/planejamento-estrategico/planejamento-estrategico-anm-2020_2023.pdf (accessed on 30 November 2020). [11]

Agência Nacional de Mineração (2019), *Relatório Anual de Segurança de Barragens de Mineração*, https://www.gov.br/anm/pt-br/assuntos/barragens/relatorios-anuais-de-seguranca-da-barragens-de-mineracao-1/relatorio-anual-gsbm-2019-v-final (accessed on 27 November 2020). [10]

Kunamoto, J. (2001), *Artisanal and Informal Mining in Peru*, World Business Council for Sustainable Development. International Institute for Environment and Development. [15]

MDNP (2020), *2020 Country Fiches: Brazil. EU-Latin America Mineral Development Network Platform*, https://www.mineralplatform.eu/tools/country-fiches. [2]

Ministério de Minas e Energia (2020), *Boletim do Setor Mineral - Outubro 2020*, https://www.gov.br/mme/pt-br/assuntos/secretarias/geologia-mineracao-e-transformacao-mineral/publicacoes-1/boletim-do-setor-mineral/boletim-do-setor-mineral-2013-outubro-2020-dados-atualizados-ate-setembro-de-2020.pdf/view (accessed on 29 March 2021). [1]

OECD (2021), *Evaluating Brazil's progress in implementing Environmental Performance Review recommendations and promoting its alignment with OECD core acquis on the environment*, OECD, https://www.oecd.org/environment/country-reviews/Brazils-progress-in-implementing-Environmental-Performance-Review-recommendations-and-alignment-with-OECD-environment-acquis.pdf. [16]

OECD (2020), *One-Stop Shops for Citizens and Business, OECD Best Practice Principles for Regulatory Policy:*, OECD Publishing, https://doi.org/10.1787/b0b0924e-en. [9]

OECD (2020), *Regulatory Impact Assessment, OECD Best Practice Principles for Regulatory Policy*, OECD Publishing, https://doi.org/10.1787/7a9638cb-en. [7]

OECD (2020), *Reviewing the Stock of Regulation, OECD Best Practice Principles for Regulatory Policy*, OECD Publishing, Paris. [4]

OECD (2019), *Tools and Ethics for Applied Behavioural Insights: The BASIC Toolkit*, OECD Publishing, Paris, https://dx.doi.org/10.1787/9ea76a8f-en. [6]

OECD (2018), *OECD Regulatory Enforcement and Inspections Toolkit*, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264303959-en. [13]

OECD (2017), *OECD Best Practice Principles on Stakeholder Engagement in Regulatory Policy: Draft for public consultation*, https://www.oecd.org/gov/regulatory-policy/public-consultation-best-practice-principles-on-stakeholder-engagement.htm. [3]

OECD (2014), *OECD Best Practice Principles: The Governance of Regulators*, OECD Publishing, https://doi.org/10.1787/9789264209015-en. [8]

OECD (2012), *Recommendation of the Council on Regulatory Policy and Governance*, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264209022-en. [5]

OECD (2010), *Cutting Red Tape: Why Is Administrative Simplification So Complicated: Looking beyond 2010*, http://www.sourceoecd.org/governance/9789264089730 (accessed on 2 August 2017). [14]

Sousa, R. et al. (2011), "Policies and regulations for Brazil's artisanal gold mining sector: Analysis and recommendations", *Journal of Cleaner Production*, Vol. 19/6-7, pp. 742-750, http://dx.doi.org/10.1016/j.jclepro.2010.12.001. [12]

2 Recent performance of the mining sector in Brazil

This chapter provides an economic overview of the mining sector in Brazil, building on its relevance, geological potential, and contribution to the Brazilian economy. Additionally, this section provides a perspective on the Brazilian mining sector vis-à-vis the mining sector in other OECD economies, such as Canada, Australia, Chile and Mexico.

Introduction

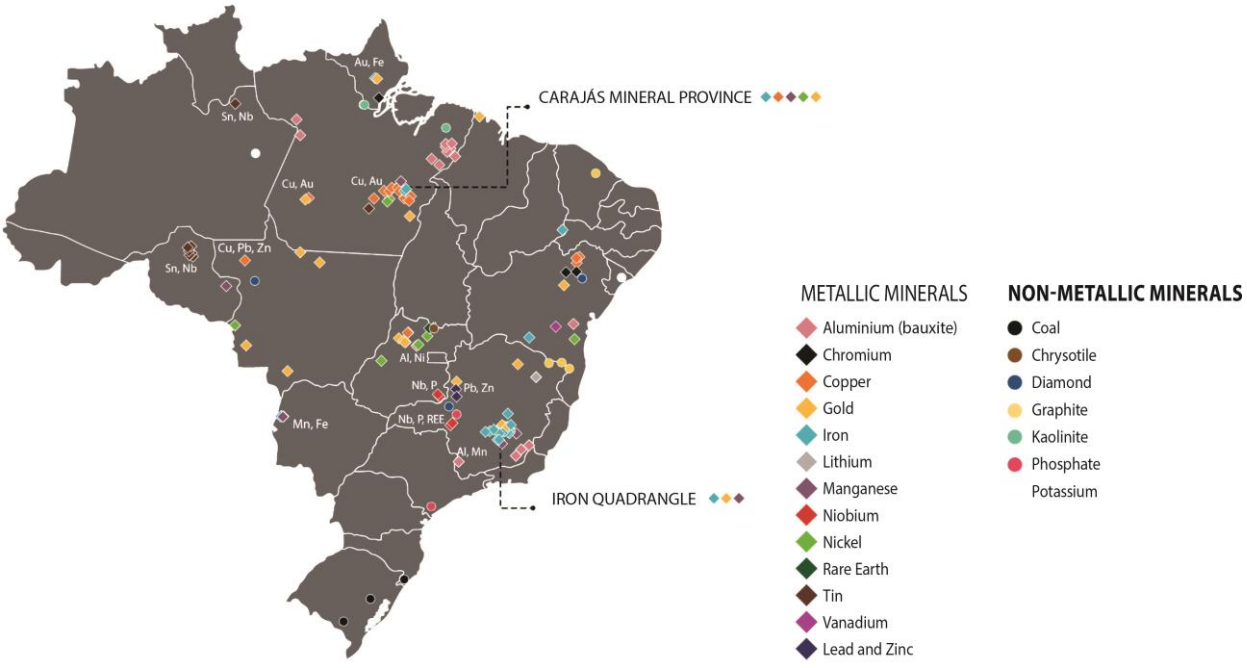
Mining has been an important part of the Brazilian economy since colonial times, when the Portuguese settled in the gold-rich region that later would become the state of Minas Gerais. Global geostrategic considerations during the two world wars and critical policy choices in the 1950s shaped Brazil's growth experience based on the export of raw materials (such as minerals) for the rest of the century (Bacha and Bonelli, 2004[1]).

Like many other governments in Latin America, Brazil deployed import-substitution industrialisation policies in the 1970s and the 1980s and aimed at promoting national industries and at reducing the dependency on imports. Brazil developed its mining industry through an active engagement of the State in pursuing a strong entrepreneurial role for itself in the productive sectors of the economy (Triner, 2011[2]). In this context, the recent history of mineral development in Brazil, after the approval of the Mining Code of 1967, has been influenced by several modifications to the legal framework regulating the industry which have modified the State's involvement in the exploitation of Brazil's mineral assets (OECD, 2017[3]).

On a global scale, Brazil is an important player in the international mining industry. For instance, it is positioned as the world's second largest producer of iron ore (USGS, 2020[4]) and the world's leading producer of niobium. The activities related to these minerals contribute significantly to the overall revenues of mineral exports.[1] The variety and geographical spread of mining activities in Brazil is shown in Figure 2.1. The two largest mining areas in the country are in Carajás (Pará) and the Iron Quadrangle (Minas Gerais).

Mining is of major importance to the Brazilian economy, contributing to the Brazilian GDP with an estimated gross value of USD 43.7 billion of mineral production for 2020. Furthermore, mineral extraction activities accounted for about 2.4% of the country's GDP in 2019 (ANM, 2021[5]).

Figure 2.1. Location of mineral deposits in Brazil



Source: ANM.

Description of the mineral potential of Brazil

This subsection explains the potential of the mineral sector of Brazil. It analyses the aggregate geological information of the country, considering the land area granted for mining activities and the availability of reserves of key metals by economic value: iron ore, copper, and gold. The analysis considers the areas open to mining activities and the description of the volumes of mineral reserves of its key metals by economic value. It also compares the mineral reserves information of Brazil with four selected OECD countries with important mining sectors: Australia, Chile, Mexico, and Canada.

Geological information: hectares granted for mining

Brazil has a vast territory. With around 8.5 million square kilometres, Brazil is the largest country in Latin America and the fifth largest country in the world, accounting for 5.6% of the world landmass. The Brazilian Federation is composed of the union of 26 states and the Federal District. Mining activities in the country are located mainly in the states of Minas Gerais, Pará, Bahia and Goiás. Nonetheless, other states such as São Paulo, Rio de Janeiro and Mato Grosso also have relevant mining industries (Furtado and Urias, 2013[6]). The Mining Code (Decree Law No. 227/1967) sets the foundations for the regulatory framework that underpins the industry. It establishes five regimes for mining tenure: authorisation regime, the concession regime, the licensing regime, the artisanal mining permit regime, and the monopolisation regime. Additional to the five regimes, the extraction register is another form of tenure considered under the Mining Code (see Box 2.1 for a summary of the main characteristics of each regime).

Box 2.1. Mining tenure regimes in Brazil

- **Authorisation and concession regimes:** are applicable to any mineral substances and can be approached as a single regime, since they are sequential, and the former depends on the latter (the exploration authorisation permit is necessary for the granting of the mining concession). The rules and procedures for these regimes are laid out in the Mining Code. The authorisation regime applies to the mineral exploration stage and the concession regime to mineral production. The process of obtaining a mining title within the authorisation and concession regimes is described in the Mining Code, the Ordinance 155/2016 of the DNPM and the Decree No. 9.406/2018. The steps to complete before receiving a mining concession are:
  1. The private party submits to ANM a request for an exploration permit.
  2. ANM analyses the request and grants the exploration permit (ANM grants the exploration permit for all mineral substances).
  3. The private party carries out exploration activities and submits to ANM the Final Exploration Report.
  4. ANM analyses the Final Exploration Report for all mineral substances and once the Agency approves it, the private party has up to one year to submit the request for a mining concession.
  5. The private party submits to ANM or the Ministry of Mines and Energy a request for mining concession, depending on the mineral substance.
  6. Table 2.1 lists the minerals that are under ANM's remit in terms of mining concessions. The Ministry of Mines and Energy grants the concessions for all other mineral substances.

Table 2.1. Mining concessions granted by ANM

Minerals under ANM's remit for granting mining concessions
Sand and gravel for immediate use in civil construction, in the preparation of aggregates and mortars, provided that they are not subjected to an industrial processing procedure, nor are they used as raw materials for the transformation industry.
Rocks and other mineral substances, when equipped for cobblestones, guides, gutters, fence posts
Clays for various industries
Ornamental and cladding rocks
Calcium and magnesium carbonates used in various industries

Note: The Ministry of Mines and Energy grants mining concessions for all other minerals.
Source: Law No. 6.567/1978 and Law No. 13.575/2017.

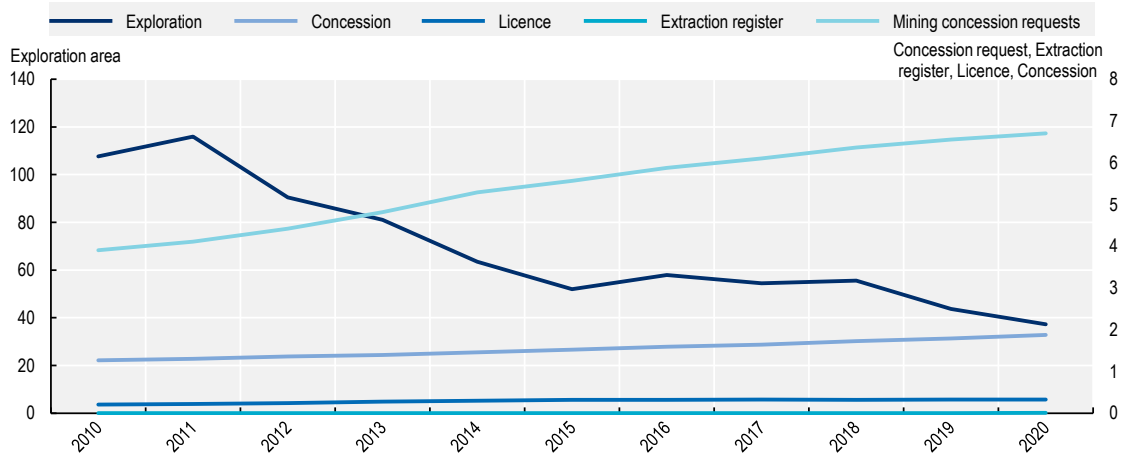
- **Licensing regime:** It is applicable to mineral substances that can be directly mined without an exploration phase. The rules and procedures for this regime, including the mineral substances that can be subject to it, are established in Law No. 6.567/1978. The duration of licensing title depends on the period defined in both the environmental and the municipality licences. Municipalities can grant licences for specific minerals (see Table 2.1). Private parties then report the licences to ANM for their registration. The latter is a necessary step before the beginning of mining activities. Under this regime, mineral resources can only be exploited by the owners of the property or by those who have their express authorisation.
- **Artisanal mining permit:** It is governed by Law No. 7.805/1989 and regulates the extraction of specific mineral substances. Its main feature is that it is intended to support a category of small miners known as *garimpeiros*. These artisanal miners can work individually or in cooperatives. The permit is granted for 5 years with the possibility of renewal and requires an environmental licence granted by the state or the municipal environmental agency.
- **Monopolisation regime:** Refers to the exploration, exploitation or processing and commercialisation of nuclear minerals and its derivatives. These minerals are under the Federal's administration monopoly.
- **Extraction register:** This register allows bodies of municipal, state, and federal administration to extract mineral substances for immediate use in civil construction works directly executed by them.

Source: Law No. 6.567/1978, Law No. 6.567/1978, Law No. 13.575/2017, and Resolution ANM No. 01/2018.

The total area granted for mining exploration in Brazil has decreased in the last ten years. The amount of hectares allocated to this mining regime peaked in 2011, in line with the height in commodities pricies, particularly of iron ore (Figure 2.2). Contrary to the growth dynamics of the granting of exploration permits, the number of mining concessions requests have increased in the last ten years. In addition, the land area granted for mineral extraction through mining concessions has also been expanding in recent times. In 2020, mining concessions represent approximately 0.8% of Brazil's territory. Several mining companies around the world looked for sustaining their production by investing in expanding their existing operations during the contraction phase of mineral commodity prices after 2014 (Mckinsey, 2016[7]). This may explain the expansion of land area for extraction activities in Brazil. Finally, the area compromised for other types of mining titles (i.e., licences and the extraction register) is exceedingly small.

Figure 2.2. Area granted by type of mining activity and regime

Area in million hectares

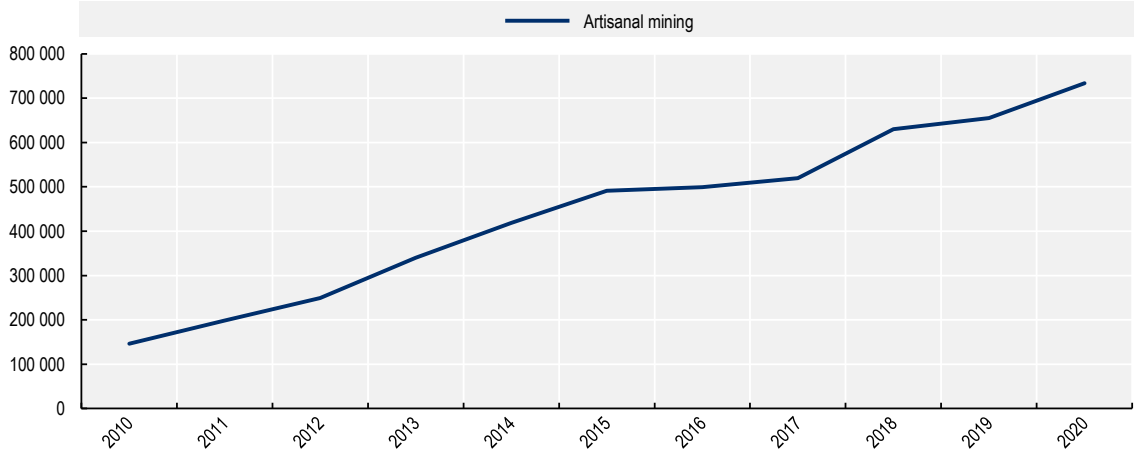


Note: The data referred to 2020 are still preliminary. The left vertical axis describes the scale of the land area granted with exploration permits, while the right vertical axis describes the scale of the other types of mining titles and the mining concessions requests. Land areas refer to active processes in the Mining Cadastre System (*Sistema Cadastro Mineiro,* SCA).
Source: ANM (2021[8]), *Cadastro Mineiro*, Portal Brasileiro de Dados Abertos, https://dados.gov.br/dataset/sistema-de-cadastro-mineiro (accessed 16 July 2021).

One significant feature in the governance of the mining sector in Brazil is the presence of artisanal mining. This small-scale mining activity is an emerging sub sector in Brazil in the sense that the amount of land area devoted to this kind of operation has been increasing in the last decade. Indeed, artisanal mining (constituted by *garimpeiros* or mining cooperatives) have increased their presence over the years, especially in recent times. Thus, the number of artisanal mining cooperatives or *garimpeiros* has more than doubled between 2010 and 2020, going from 871 to 1 890 according to ANM. This increase in the number of relevant parties has its counterpart in the land area dedicated to this type of activity. As shown in Figure 2.3, in a period of only 10 years the number of hectares dedicated to artisanal mining has increased more than fivefold, from 145 932 hectares in 2010 to 734 065 hectares in 2020.

Figure 2.3. Land area devoted to artisanal mining

Area in hectares

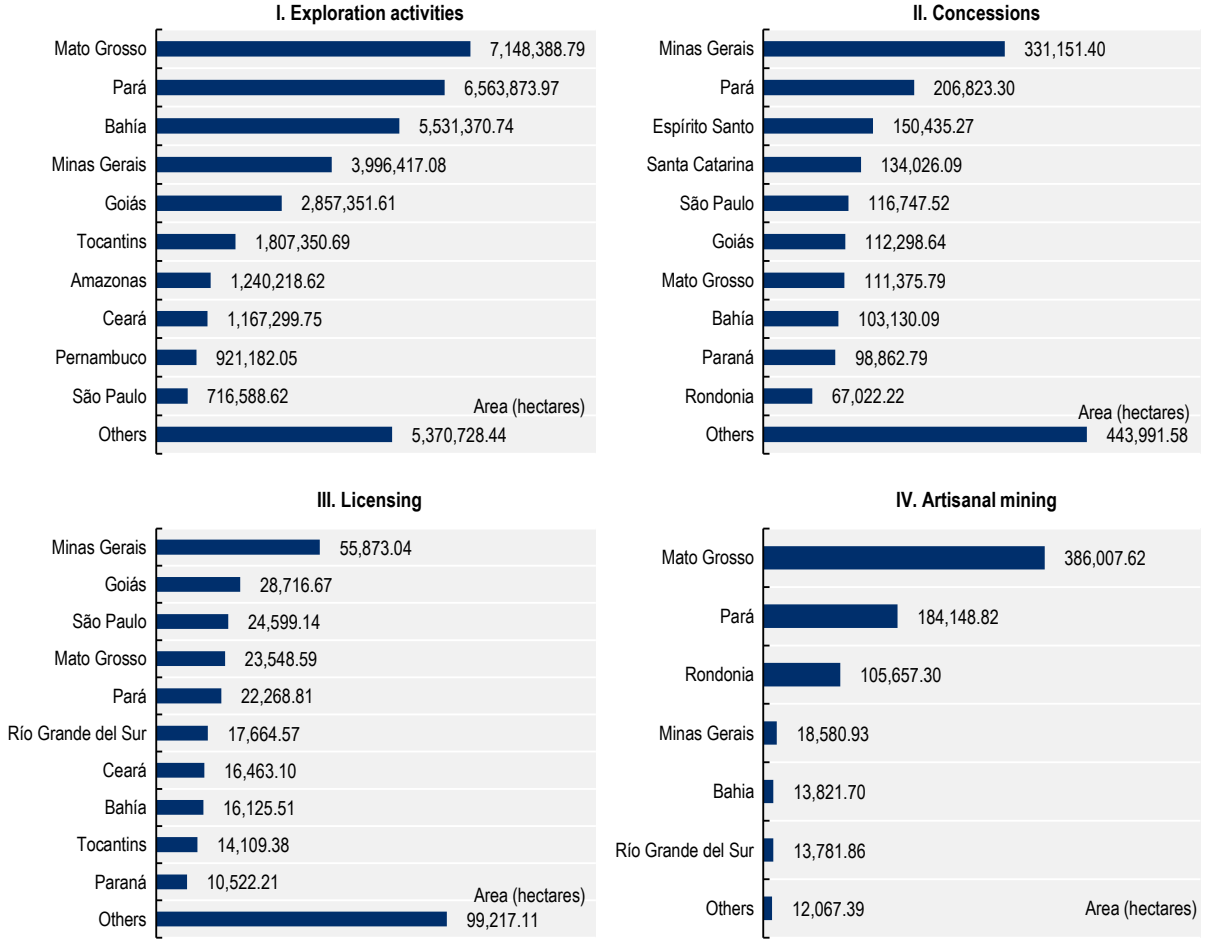


Notes: The data referred to 2020 are still preliminary. Land areas refer to active processes in the Mining Cadastre System (*Sistema Cadastro Mineiro,* SCA).
Source: ANM (2021[8]), *Cadastro Mineiro*, Portal Brasileiro de Dados Abertos, https://dados.gov.br/dataset/sistema-de-cadastro-mineiro (accessed 16 July 2021).

The first panel on Figure 2.4 shows the distribution of land area granted for different mining activities in 2020, for selected states. Mato Grosso, Pará, Bahia and Minas Gerais are the states that concentrate the majority of the territory devoted to exploration activities and account for 62% of the total area allocated to this phase. These states are the most interesting exploration places in terms of geological potential given their history of discovery successes and their long tradition of mineral extraction. Mato Grosso stands out for its richness of deposits containing gold. Pará has resources of iron ore (in the region of Carajás), manganese, copper, and aluminum. Bahía contains deposits of iron ore, gold, and construction minerals. Minas Gerais have large deposits of iron ore and manganese in the "Iron Quadrangle", and rare earths (ANM, 2019[9]).

Minas Gerais and Pará concentrate the largest extensions of area devoted to mining concessions (almost 29% of total assigned area for mineral extraction in Brazil). These states contain some of the most important mining operations in Brazil, especially the ones dedicated to iron ore extraction (ANM, 2019[9]). In fact, the largest iron mine in the world is located in Pará, the *Ferro Carajás* Project. Mining production in these states is vast and they are responsible for 64% of Brazilian mining exports: Minas Gerais accounts for 43% and Pará accounts for 21% (Moraal, 2018[10]). The second panel on Figure 2.4 shows the most relevant states in terms of territory allocated to mining concessions.

Figure 2.4. Land area devoted to mining activities, by state, 2020



Note: Refers to active processes.
Source: ANM (2021[8]), *Cadastro Mineiro*, Portal Brasileiro de Dados Abertos, https://dados.gov.br/dataset/sistema-de-cadastro-mineiro (accessed 16 July 2021).

The third panel on Figure 2.4 focuses on the licensing scheme, where Minas Gerais, Goiás, São Paulo, and Matto Grosso have the highest concentration of licensed area with 40% of the total. Finally, Mato Grosso, Pará, and Rondônia exhibit the largest land area granted for artisanal mining activities with 92% of the total area devoted to artisanal mineral extraction (fourth panel on Figure 2.4). The main minerals extracted by *garimpeiros* are gold, precious stones, and construction materials.

Geological information: Reserves

Brazil has a large *geological potential*, as well as a high level of mineral reserves and production (Khindanova, 2011[11]). Indeed, Brazil occupies the first places in the production of some minerals such as manganese, niobium, or tantalite (Korinek and Ramdoo, 2017[12]). The Brazilian mining sector produces three important mineral commodities by economic value: iron ore, copper, and gold. The analysis of the geological and production information will focus on these commodities. Table 2.2 shows the information on the reserves of these three commodities that are available in Brazil. In addition, data from four OECD countries with important mining industries (Australia, Chile, Mexico, and Canada) are included for comparison purposes.

Brazil ranks especially high in iron ore mineral reserves compared to other OECD countries. After Australia, Brazil is the second country with the largest iron reserves in the world. Australia registers reserves amounting to 48 000 thousand metric tons, which represents 28% of world reserves. Brazil, for its part, has over 33 000 thousand metric tons of iron ore, 19.6% of the world's total reserves. Canadian iron reserves reach a value of 6 000 thousand metric tons, approximately 4% of the total reserves in the world. In the case of gold, Australia is the country with the largest proven reserves in the world (Department of Industry, Science, Energy and Resources, 2020[13]). The country has an estimated of 10 000 metric tons, equivalent to 20% of the total gold available in the world. In contrast, Brazilian gold reserves represent 3.4% of total world reserves, with 1,700 metric tons of gold reserves.

Table 2.2. Iron ore, gold and copper reserves by country

	Iron Ore[1]		Gold[2]		Copper[2]	
	Reserve (thousand metric tons)	World share (%)	Reserve (metric tons)	World share (%)	Reserve (thousand metric tons)	World share (%)
Australia	48 000	28%	10 000	20%	87 000	10%
Canada	6 000	4%	1 900	4%	8 984	1%
Chile	NA	NA	0.25	0.001%	200 000	23%
Mexico	NA	NA	1 400	3%	53 000	6%
Brazil	33 241	19.6%	1 700	3.4%	9 664	1.1%

1. Mineral ore reserve.
2. Mineral reserve in Metal content.
Source: U.S. Geological Survey (2020[14]), *Mineral Commodity Summaries 2020*, https://doi.org/10.3133/mcs2020 (accessed 19 July 2021) and ANM (2020[15]), Relatório Anual de Lavra.

Finally, regarding the case of copper, globally, the country with the largest reserves is Chile. This country has available 200 thousand metric tons of copper reserves, a figure that represents 23% of the world's total. Australia is the second country with the largest reserves: 87 thousand metric tons (10% of the global total reserves). Mexico, which has 53 thousand tons of cooper, is the third country with the largest reserves in the table and the fourth in the world ranking. Canada has 8.9 million tons of copper as reserves. Finally, Brazil has 9,664 metric tons of copper reserves. Its share does only reach 2% of the world's total reserves of copper.

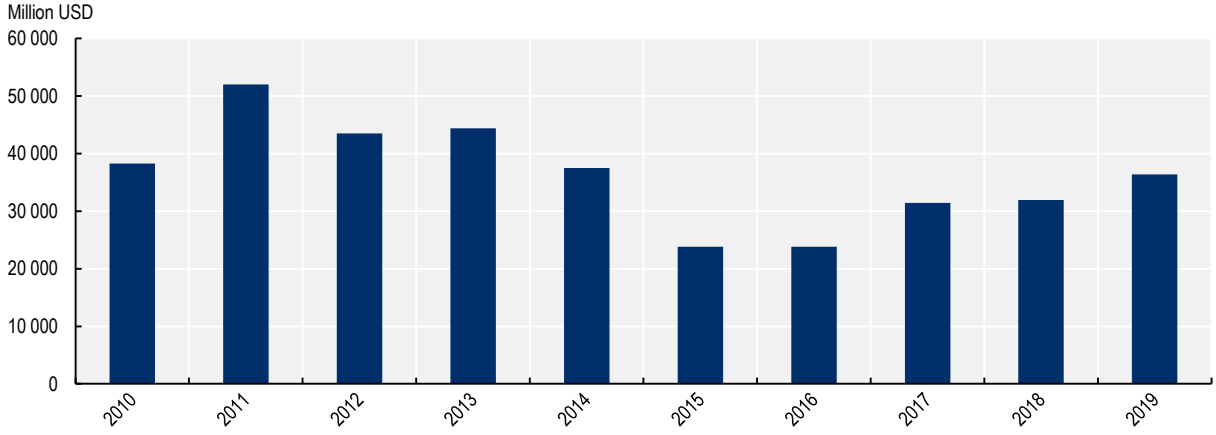
Brazil has a strong geological potential given its considerable land area and the large quantities of mineral reserves of key metals such as iron ore, copper and gold compared to other OECD countries with relevant mining industries.

Product information

Brazil produces a wide range of mineral substances. Brazil is the largest producer of niobium worldwide, the second largest producer of iron ore and manganese, and it is among the top producers of bauxite and tin (KPMG, 2015[16]), (MDNP, 2020[17]). In 2019, metallic minerals accounted for 80% of the total value of metallic and non-metallic mineral production (ANM, 2020[18]). In 2019, Brazil had active exploration or exploitation titles for 37 metallic minerals (ANM, 2020[18]). In terms of non-metallic substances, one of the most important is vermiculite, for which it accounts for roughly 20% of world production (ANM, 2020[18]).

Figure 2.5 summarises the information of the production value of mining extraction. The total value decreased from 2011 to 2016 due to the end the of the last commodity boom, which contracted metal prices to historic lows. Another reason that contributed to the secular reduction of mineral production value was the contraction of the rate of extraction of certain minerals such as iron ore and gold due to the depletion of the deposits and the effect of the suspension of some iron ore operations after the disaster of Mariana in 2015. The mineral production value recovered its pace after the rise of commodity prices in 2017. In 2019, production value was of USD 36.4 billion.

Figure 2.5. Production value

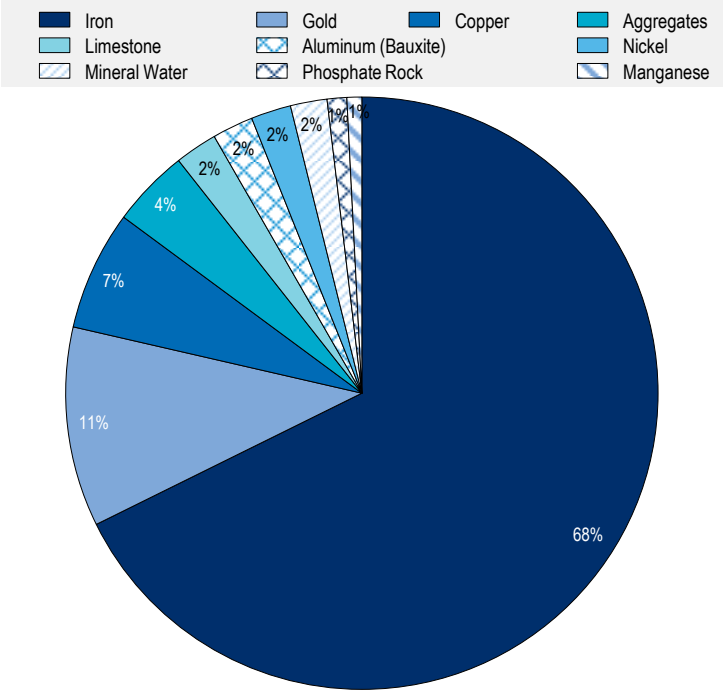


Source: ANM (2020[15]), Relatório Anual de Lavra.

Main products

As mentioned above, metallic mining is the most relevant mineral activity in Brazil. About 80% of the value of mining production corresponds to metallic substances (ANM, 2020[18]). Figure 2.6 shows the contribution of each mineral to the value of mining production in 2020. As can be seen, iron is by far the most important mineral in the sector (68%). The second and third most important metals are gold and copper, respectively. However, the contribution of each of these products is fairly small compared to that of iron. Specifically, in 2020 gold accounted for 11% of the production value and copper for 7%. The rest of mining products have a participation of less than 5% in the value of the sector's production.

Figure 2.6. Contribution to production value by mineral substance, 2020



Source: ANM (2020), Anuário Mineral Brasileiro, Agência Nacional de Mineração. Relatório Anual de Lavra – RAL).

Production volume

The previous subsection showed that the three most important mineral commodities by economic value in the Brazil are iron ore, gold and copper. Table 2.3 compares the Brazilian production of these products with respect to other OECD economies with relevant mining sectors. It also exhibits their share in world production. In the case of iron ore, the most important mining product of Brazil, of the five countries analysed, Australia is the one with the highest production: 562 million tons. In fact, Australia is the world's largest iron ore producer with a 37% share in world production in 2018. Australia is also the largest iron ore exporter in the world (Department of Industry, Science, Energy and Resources, 2019[19]). Brazil is the second largest producer of iron ore in the world, with a 19% share in global production. Canada, Chile and Mexico, although they produce iron ore, do not have a significant participation in total world's production of this commodity.

Table 2.3. Production of iron ore, gold and copper by country

	Iron ore		Gold		Copper	
	Production (thousand metric tons)	World share (%)	Production (kilograms)	World share (%)	Production (thousand metric tons)	World share (%)
Australia	562 137	37%	315 100	10%	960	5%
Canada	31 500	2%	183 047	6%	542	3%
Chile	8 493	1%	37 066	1%	5 832	29%
Mexico	14 021	2%	117 323	4%	751	4%
Brazil	292 778	19%	80 000	2%	348	2%

Note: For iron ore, the data is referred to 2018; for gold, the data is referred to 2018; for copper, the data is referred to 2018.
Source: (U.S. Geological Survey, 2020[14]), Mineral Commodity Summaries 2020, https://doi.org/10.3133/mcs2020 (accessed 19 July 2021) and ANM (2020[15]), Relatório Anual de Lavra.

In the case of gold, Australia is once again the leader in production among the five countries studied, with 315 100 kilograms produced in 2018, equivalent to 10% of the world production of that year. Although in 2019 it was not the top gold producer in the world, projections foresee that by 2021 Australia will surpass China as the largest gold producing country worldwide (Department of Industry, Science, Energy and Resources, 2019[19]). On the other hand, Canada and Mexico produced 183 047 (6%) and 117 323 (4%) kilograms in 2018, respectively. Brazil, which ranks fourth in this table, for that year reached a production of 80 000 kilograms, which is equivalent to 2% of world production. Finally, Chile is the OECD country in the region with the lowest gold production, only 37 066 kilograms, which only represents 1% of world production.

Chile is the world's largest copper producer. In 2018, the Chilean production of mine copper exceeded 5 million metric tons, a figure that represents 29% of the world total supply for that year. The second OECD country with the highest production of this metal was Australia, with a production of 960 thousand metric tons. Although this represents 5% of world production, over the last few years Australia has been among the ten most important countries in the production of this mineral. Canada and Mexico registered productions of 542 and 751 thousand tons, equivalent to 3% and 4% respectively of the world's share. The copper mine production in Brazil in 2018 was 348 thousand metric tons, approximately 2% of world's production.

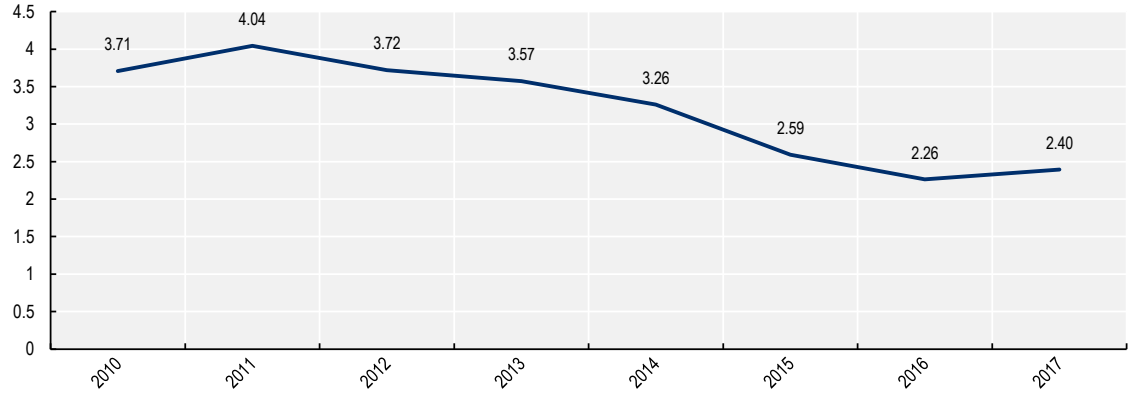
The recent evolution of key economic indicators of the mining sector in Brazil

This section will analyse the recent performance of Brazil regarding different economic indicators related to its mining sector. It will also provide a comparison of economic performance of the mineral sector with respect to the general economic performance of Brazil, and with respect to the mineral industries of selected OECD member countries.

Contribution to the GDP

Mining plays an important role in the Brazilian economy. During the last decade, the contribution of this sector to the national economy has fluctuated between 2% and 4% (ANM, 2020[20]), (Gallegos and Vásquez Cordano, 2020[21]). The main activities of the mining industry –due to its contribution to national production– are the extraction of iron ore, the manufacture of metal-derived products and the manufacture of non-metallic products. In 2017, only these three activities together accounted for 1.61% of the Brazilian GDP. Figure 2.7 shows the evolution of the contribution of mining activities to the Brazilian GDP from 2011 to 2017. Mining GDP has been declining during the last decade achieving a contribution value of approximately 2.4% in 2017.

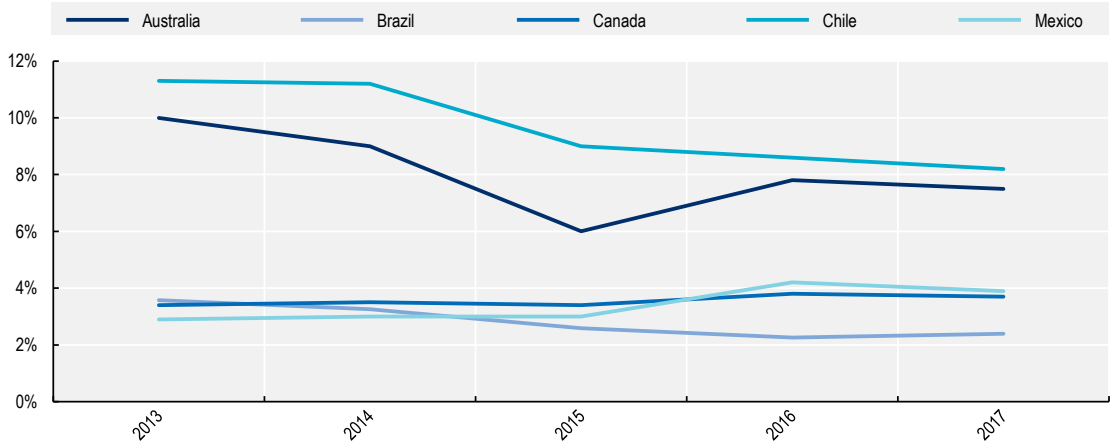
Figure 2.7. Mining GDP of Brazil as share of the National GDP, 2010-17



Source: IBGE (2020[22]), Sistema de Contas Nacionais: Brasil, https://www.ibge.gov.br/estatisticas/economicas/contas-nacionais/9052-sistema-de-contas-nacionais-brasil.html?=&t=o-que-e (accessed 19 July 2021).

Figure 2.8 summarises the contribution of mining to the national GDP of Brazil and four OECD countries: Australia, Canada, Chile, and Mexico. In the Brazilian case, between 2013 and 2017, the mining GDP as a percentage of the national GDP decreased by more than 1%, from 3.57% to 2.4%. Furthermore, during this period, on average, the sector's contribution to the national economy was lower in Brazil than in Canada and Mexico. Although in Australia and Chile the importance of the sector is notably higher, the gap with respect to Brazil has been decreasing over the last few years.

Figure 2.8. Mining GDP as share of National GDP for selected mineral economies, 2013-17

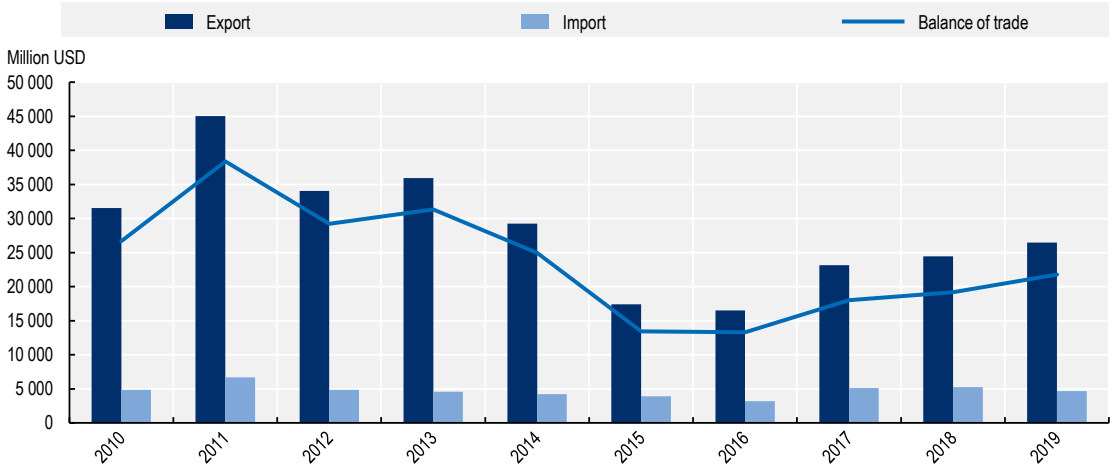


Source: IBGE (2020[22]), *Sistema de Contas Nacionais: Brasil*, https://www.ibge.gov.br/estatisticas/economicas/contas-nacionais/9052-sistema-de-contas-nacionais-brasil.html?=&t=o-que-e (accessed 19 July 2021) and Gallegos, A. and A. Vásquez Cordano (2020[21]), "Benchmarking de planeamiento sectorial como impulsor de la competitividad minera", http://repositorio.gerens.edu.pe/bitstream/20.500.12877/61/1/DT_002_2020_EPG_Gallegos_.

Contribution to the foreign sector

In addition to its contribution to the domestic economy, in Brazil mining is also a key industry for the foreign sector. As Figure 2.9 shows, throughout the last decade the mining trade balance has been in surplus. The drop in exports between 2011 and 2016, as well as in the value of production, would be explained by the decline in mineral commodity prices as a result of the end of the last commodity super cycle (Erdem and Ünalmış, 2016[23]), (Vásquez Cordano and Zellou, 2020[24]). Therefore, as of 2017, a continuous recovery in the FOB[2] value of Brazilian mineral exports is also observed. Thus, for 2019 the value of the sector's net trade balance was USD 21 772 million.

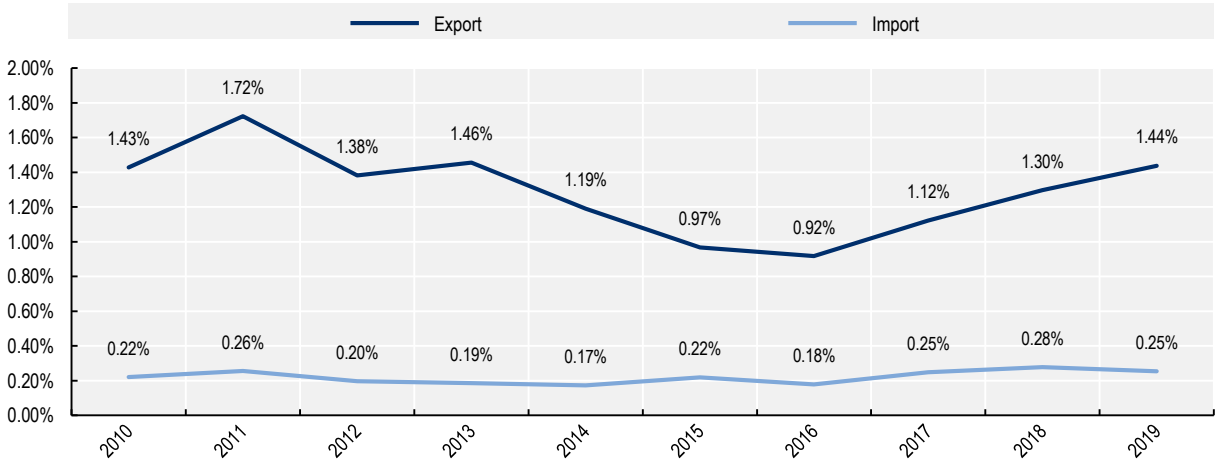
Figure 2.9. Mining import and export values, Brazil, 2010-19



Source: Ministério da Economia (2020[25]), *Comex Stat*, http://comexstat.mdic.gov.br/pt/home.

The proportion of the national GDP that exports and imports represent reflects the relevance of the mining industry for the foreign sector (Figure 2.10). The last decade began with exports equivalent to 1.43% of the gross domestic product. In correspondence with the decrease in the value of exports between 2011 and 2016 (shown in Figure 2.9), during this period exports as a percentage of GDP also fell to 0.92%. As of 2017, the year in which commodity prices begin to recover, the value of exports has increased continuously. In 2019, mining exports were equivalent to 1.44% of GDP. On the other hand, in terms of imports, throughout the decade these have been on average 0.2% of GDP.

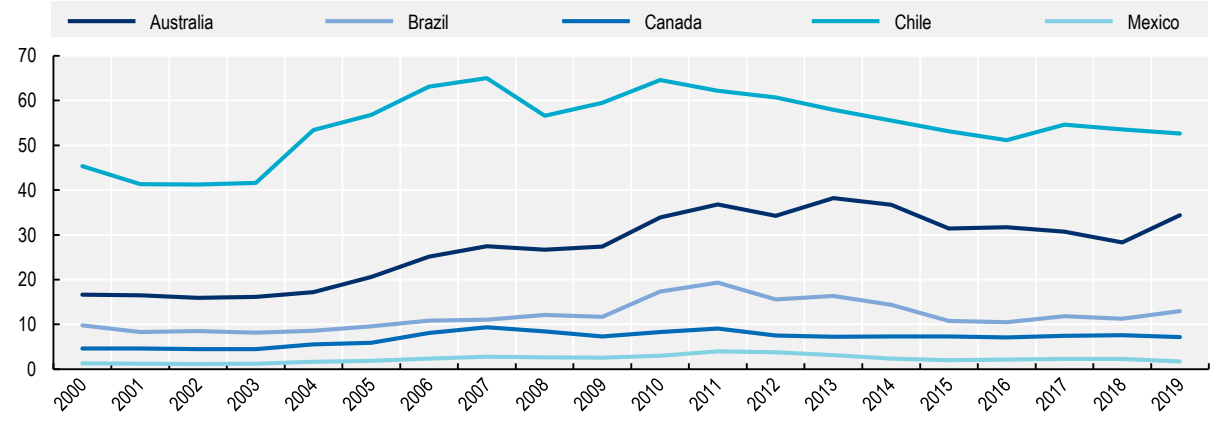
Figure 2.10. Mining imports and exports as share of Brazil's GDP, 2010-19



Source: Ministério da Economia (2020[25]), *Comex Stat*, http://comexstat.mdic.gov.br/pt/home.

Figure 2.11 shows mining exports as a percentage of merchandise exports[3] for the period 2000-2019 for Brazil and the four OECD countries selected for the benchmarking. In this period, Brazilian exports of minerals and metals represented between 9.8% and 13% of the total merchandise exports. Thus, in Brazil, mining has less weight in the foreign sector compared to Australia and Chile, countries in which the value of mining exports reached 34% and 53% of the value of total merchandise exports in 2019. Compared with Canada and Mexico, on the contrary, Brazil has a more presence of its mining sector in the trade balance. In Mexico, mineral and metal exports have only represented around 2% of merchandise exports; in Canada, mining exports have only represented between 4% and 7% in the last years. This means that Canada and Mexico have a more diversified portfolio of exports than Brazil, Chile, and Australia.

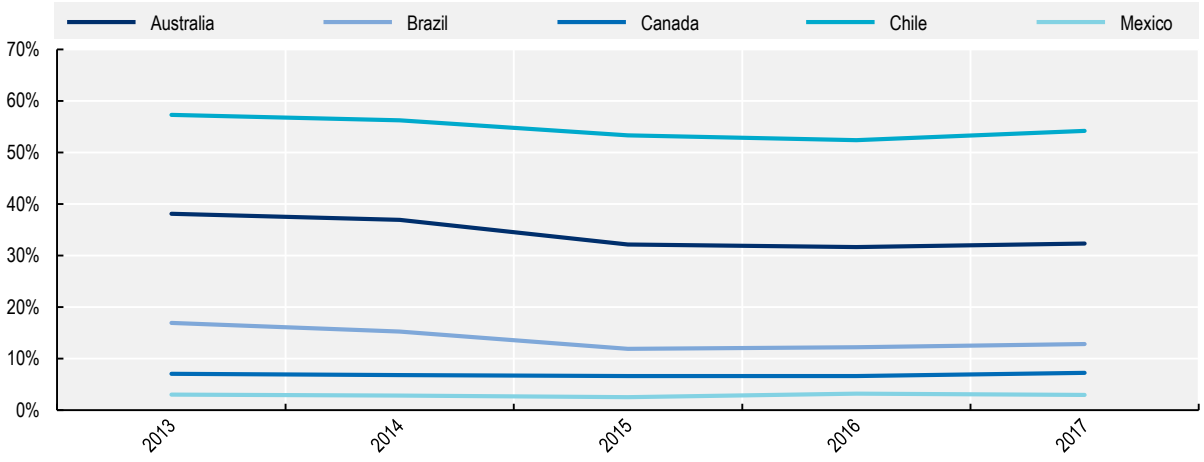
Figure 2.11. Ores and metal exports as share of merchandise exports, 2000-19



Source: The World Bank (2021[26]), *Ores and metals exports (% of merchandise exports)*, https://data.worldbank.org/indicator/tx.val.mmtl.zs.un?end=2019&locations=br-au-cl-mx&start=2000 (accessed 19 July 2021).

Another indicator to measure the performance of the mining sector in the trade balance is mining exports as a percentage of total exports. Figure 2.12 summarises the evolution of this indicator during the years 2013 and 2017 for Brazil and the four OECD countries considered in this analysis. For Brazil, mining exports as a percentage of the country's total exports decreased, going from 16.9% in 2013 to 12.8% in 2017. On the other hand, in comparative terms, as shown in Figure 2.11, this indicator places Brazil above Canada and Mexico, but below Australia and Chile. Indeed, the value of Brazilian mining exports (as a percentage of total exports) is almost double that of Canadian exports and three times that of Mexico, while it is almost half and a third of Australian and Chilean exports, respectively.

Figure 2.12. Mining exports as share of total exports, 2013-17



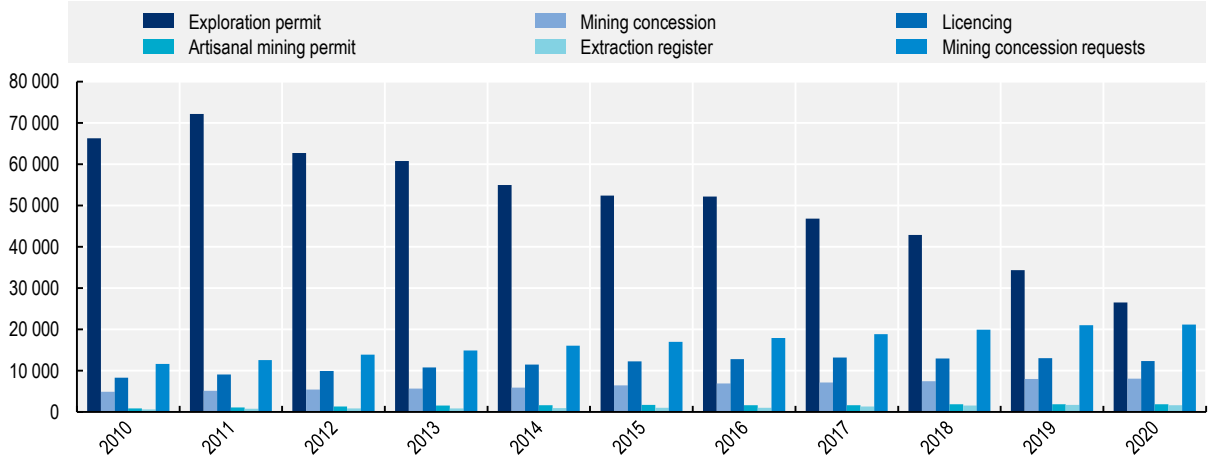
Source: (Gallegos and Vásquez Cordano, 2020[21]), "Benchmarking de planeamiento sectorial como impulsor de la competitividad minera", http://repositorio.gerens.edu.pe/bitstream/20.500.12877/61/1/dt_002_2020_epg_gallegos_.

Industry composition and employment

Although mining is an industry characterised by being capital intensive, it is still an important source of employment in Brazil. Figure 2.13 shows the evolution of the number of companies by type of permit in the last 10 years. Companies with exploration permits are the most abundant, although their number has decreased over time, from 66 324 in 2010 to 26,515 in 2019. The second most abundant type of mining company is the one that contains the mining concession application records. Unlike companies with exploration permits, these have been growing in number, going from 11 645 in 2010 to 21 203 in 2019. On the other hand, the least representative in absolute numbers are those holders of an extraction record and those that have a permit for artisanal mining. Both have also increased their presence in the last decade. Thus, public bodies with an extraction record have gone from 681 to 1 671, while artisanal mining cooperatives went from 871 to 1 890.

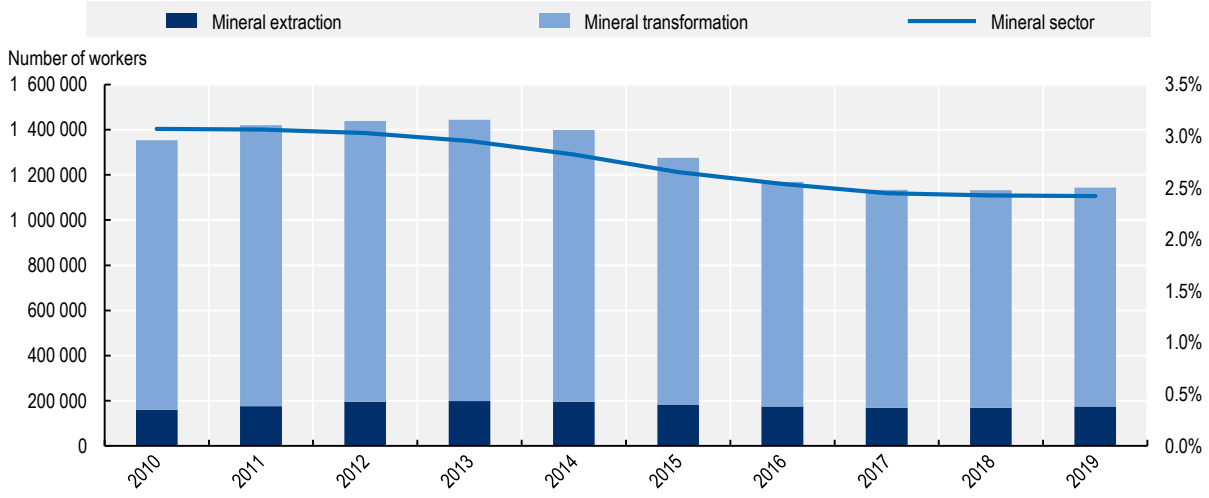
In keeping with the country's high mining potential and the high number of existing mining companies, during this decade mining has generated more than one million jobs each year. Figure 2.14 summarises the information on the labor force employed both in the extractive subsector and in the transformation subsector of the industry.

Figure 2.13. Number of holders by type of mining regime, Brazil, 2010-19



Source: ANM (2021[8]), *Cadastro Mineiro*, Portal Brasileiro de Dados Abertos, https://dados.gov.br/dataset/sistema-de-cadastro-mineiro (accessed 16 July 2021).

Figure 2.14. Employment in the Brazilian mineral sector, 2010-19



Source: Ministério da Economia (2020[27]), Cadastro Geral de Empregados e Desempregados (CAGED), https://portalfat.mte.gov.br/programas-e-acoes-2/caged-3/ (accessed 19 July 2021) and Ministério da Economia (2020[28]), Relação Anual de Informações Sociais (RAIS), http://www.rais.gov.br/sitio/index.jsf (accessed 19 July 2021).

The overall number of workers has decreased slightly since 2014. The transformation subsector is the one with the highest employability, since around 85% of mining workers belong to the said subsector. However, the transformation subsector is also the one with the greatest contraction: between 2010 and 2019, employment in this sector contracted by 19%, while employment in the extraction subsector contracted by only 9%. Finally, the contribution of the mining sector to national employment during the last decade has been 2.74%.

Notes

[1] See http://investinbrazil.biz/industry/metallurgy/brazil-mining-industry (accessed 27 December 2020).

[2] FOB stands for "free on board, named port of loading". It is an *incoterm* – an international trade clause – used for sales and purchase transactions where the goods (in this case, mining products) are transported by ship, either by sea or inland waterway. It should always be used followed by the name of a port of loading. FOB is one of the most commonly used incoterms.

[3] Merchandise exports are constituted by all goods which subtract from the stock of material resources of a country by leaving (exports) its economic territory. See for further details: United Nations. International Merchandise Trade Statistics. Concepts and Definitions. Series F, No. 52, Rev. 2 (United Nations publication, Sales No. E.98.XVII.16), (paragraph 14).

References

ANM (2021), *Anuário Mineral Brasileiro Principais Substâncias Metálicas 2021 - Versão Preliminar Produção*, https://www.gov.br/anm/pt-br/centrais-de-conteudo/publicacoes/serie-estatisticas-e-economia-mineral/anuario-mineral/anuario-mineral-brasileiro/AMB_2021_Prod_Preliminar_para_publicacao2.pdf (accessed on 18 August 2021). [5]

ANM (2021), *Cadastro Mineiro*, Portal Brasileiro de Dados Abertos, https://dados.gov.br/dataset/sistema-de-cadastro-mineiro (accessed on 16 July 2021). [8]

ANM (2020), *Anuário Mineral Brasileiro*, Agência Nacional de Mineração. Relatório Anual de Lavra - RAL. [20]

ANM (2020), *Anuário Mineral Brasileiro*, https://www.gov.br/anm/pt-br/centrais-de-conteudo/publicacoes/serie-estatisticas-e-economia-mineral/anuario-mineral/anuario-mineral-brasileiro/amb_2020_ano_base_2019_revisada2_28_09.pdf (accessed on 23 March 2021). [18]

ANM (2020), *Relatório Anual de Lavra*. [15]

ANM (2019), *Anuário Mineral Brasileiro*, Agência Nacional de Mineração. [9]

Bacha, E. and R. Bonelli (2004), *Coincident Growth Collapses: Brazil and Mexico since the early 1980s*, Institute for Economic Policy Studies, https://www.researchgate.net/publication/319305155_Brazil_and_Mexico_since_the_early_1980s. [1]

Department of Industry, Science, Energy and Resources (2020), *Resources and Energy Quarterly. March 2020*. [13]

Department of Industry, Science, Energy and Resources (2019), *Resources and Energy Quarterly. March 2019*, https://publications.industry.gov.au/publications/resourcesandenergyquarterlymarch2019/documents/Resources-and-Energy-Quarterly-March-2019.pdf. [19]

Erdem, F. and İ. Ünalmış (2016), "Revisiting super-cycles in commodity prices", *Central Bank Review*, Vol. 16/4, pp. 137-142. [23]

Furtado, J. and E. Urias (2013), *Recursos naturais e desenvolvimento - estudos sobre o potencial dinamizador da mineração na economia brasileira*, IBRAM, https://ibram.org.br/publicacoes/?txtSearch=recursos+naturais+e+desenvolvimento#publication (accessed on 19 July 2021). [6]

Gallegos, A. and A. Vásquez Cordano (2020), "Benchmarking de planeamiento sectorial como impulsor de la competitividad minera", http://repositorio.gerens.edu.pe/bitstream/20.500.12877/61/1/DT_002_2020_EPG_Gallegos_Vasquez_Benchmarking.pdf (accessed on 19 July 2021). [21]

IBGE (2020), *Sistema de Contas Nacionais: Brasil*, https://www.ibge.gov.br/estatisticas/economicas/contas-nacionais/9052-sistema-de-contas-nacionais-brasil.html?=&t=o-que-e (accessed on 19 July 2021). [22]

Khindanova, I. (2011), "Location factors for non-ferrous exploration expenditures", *Journal of Applied Business and Economics*, Vol. 12/1, pp. 38-45, http://www.m.www.na-businesspress.com/JABE/KhindanovaWeb.pdf. [11]

Korinek, J. and I. Ramdoo (2017), "Local content policies in mineral-exporting countries. The case of Brasil", *OECD Trade Policy Papers, N. 209*, https://www.oecd.org/trade/topics/trade-in-raw-materials/documents/trade-raw-materials-brazil-country-note.pdf. [12]

KPMG (2015), *Brazil. Country Mining Guide*, KPMG Publishing, https://assets.kpmg/content/dam/kpmg/pdf/2016/01/brazil-mining-country-guide.pdf. [16]

Mckinsey (2016), *Lower exploration spending – another response to the end of the commodity price boom*, Mckinsey&Company, Metals and Mining Practice. [7]

MDNP (2020), *EU-Latin America Mineral Development Network Platform*, https://www.mineralplatform.eu/tools/country-fiches. [17]

Ministério da Economia (2020), *Cadastro Geral de Empregados e Desempregados (CAGED)*, https://portalfat.mte.gov.br/programas-e-acoes-2/caged-3/ (accessed on 19 July 2021). [27]

Ministério da Economia (2020), *Comex Stat*, http://comexstat.mdic.gov.br/pt/home. [25]

Ministério da Economia (2020), *Relação Anual de Informações Sociais (RAIS)*, http://www.rais.gov.br/sitio/index.jsf (accessed on 19 July 2021). [28]

Moraal, W. (2018), *Duurzaam, Agrarisch, Innovatief en Internationaal ondernemen. Sectorschets Mining*, Rijksdienst voor Ondernemend Nederland, https://www.rvo.nl/sites/default/files/2018/06/sectorschets-mining-nbso-brazil-belo-horizonte.pdf. [10]

OECD (2017), *Local content policies in mineral-exporting countries: The case of Brazil*, OECD Paris, https://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=TAD/TC/WP(2016)3/PART2/FINAL&docLanguage=En. [3]

Roe, A. (2017), *Lower exploration spending – another response to the end of the commodity price boom*, https://www.wider.unu.edu/publication/lower-exploration-spending-%E2%80%93-another-response-end-commodity-price-boom. [29]

The World Bank (2021), *Ores and metals exports (% of merchandise exports)*, https://data.worldbank.org/indicator/TX.VAL.MMTL.ZS.UN?end=2019&locations=BR-AU-CL-MX&start=2000 (accessed on 19 July 2021). [26]

Triner, G. (2011), *Mining and the State in Brazilian Development*, Routledge - Taylor & Francis, https://www.routledge.com/Mining-and-the-State-in-Brazilian-Development/Triner/p/book/9781138664388. [2]

U.S. Geological Survey (2020), *Mineral Commodity Summaries 2020*, https://doi.org/10.3133/mcs2020 (accessed on 19 July 2021). [14]

USGS (2020), *Mineral Commodities Summaries - Iron Ore*, U.S. Geological Survey, https://pubs.usgs.gov/periodicals/mcs2020/mcs2020-iron-ore.pdf. [4]

Vásquez Cordano, A. and A. Zellou (2020), "Super cycles in natural gas prices and their impact on Latin American energy and environmental policies", *Resources Policy*, Vol. 65/1, p. 101513, https://ideas.repec.org/p/ger/dtrabj/005.html. [24]

3 The institutional and regulatory frameworks of mining activities in Brazil

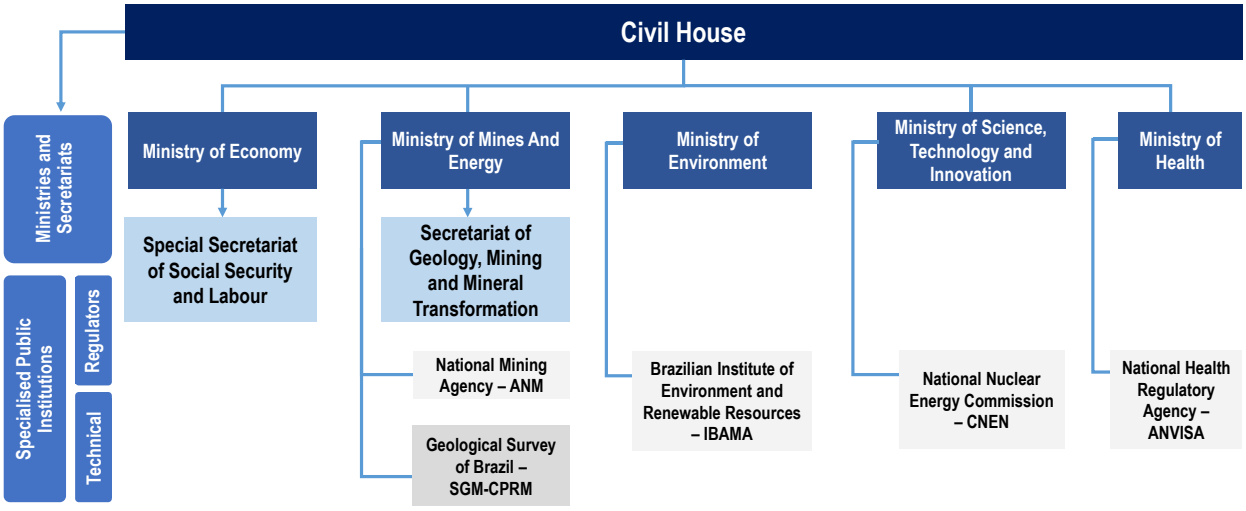
This chapter describes the main legal instruments of the mining regulatory framework in Brazil and provides an overview of the institutional setup in the country. The section offers an overview of the regulations that aim at fostering the geological potential and access to mineral substances in Brazil and identifies regulatory gaps that affect the performance of the sector. Finally, the chapter addresses the recent reforms that have taken place to improve the legal framework of the mining sector.

Institutional landscape

Governmental institutions related to mining regulation

Figure 3.1 shows the organisation of institutions involved in the regulation of the mining industry in Brazil. There are several entities involved in the regulations of safety, labour, and environmental standards in the Brazilian government. This subsection describes the functions and competencies of each of these institutions.

Figure 3.1. Federal government institutions related to the mining sector in Brazil



Source: ANM and MME.

National Mining Agency (ANM)

In 1934,[1] the National Department of Mineral Production (DNPM) was created as a division of the Ministry of Agriculture, Trade and Public Works, with the objective of managing, regulating, and inspecting the sector (Câmara dos Deputados do Brasil, 2013[1]). In 1960, the Ministry of Mines and Energy (MME) was created, absorbing all matters related to mining, and thus, the DNPM was transferred to the MME. Additionally, the Secretariat of Geology, Mining and Mineral Transformation was established as the unit in charge of dictating the public policies for the mineral sector. The National Mining Agency (ANM) substituted the DNPM in 2017.

The National Mining Agency (ANM for its acronym in Spanish) is the regulatory body for the Brazilian mining sector. Created in 2017 by Law No. 13 575, the ANM is an autonomous federal institution linked to the Ministry of Mines and Energy and whose objective is to "promote the management of mineral resources in the Union, as well as regulate and supervise activities that involve the use of mineral resources at the national level".[2] It was created to replace the National Department of Mining Planning (DNPM),[3] as part of a set of initiatives to review and update the mining regulatory framework, including the promulgation of a new Mining Code.

ANM is responsible for a series of functions of different types. Thus, the ANM designs, implements, and supervises compliance with the mining regulatory norm (NRM). Likewise, the agency has the sanctioning authority in case of breaches of safety regulations. Regarding information management, the ANM also requests and consolidates the information on the mining sector provided by the holders of mining rights. Likewise, the ANM administers the mining registry, and the registry of property titles and mining rights and

regulates the exchange of information on mining operations between the authorities and entities of the Union, the States, the Federal District, and the Municipalities. Another type of function performed by the ANM is the granting of mining titles: exploration permits for all mineral substances and mining concessions for a certain group of minerals.[4]

Finally, the ANM also fulfills fiscal functions since, in addition to regulating and supervising the compliance of safety and technical standards, it also collects and manages mining income and contributions from the Financial Compensation for Operating Mineral Resources (CFEM), the Annual Rate per Hectare (TAH) and the fines imposed by the same agency.

Civil House

The Civil House is an institution with ministry status linked to the Presidency of the Republic. Its main responsibilities are i) the co-ordination and integration of government policies, ii) the evaluation and monitoring of government policies, iii) the administration of the institutions that are part of the federal public administration, and iv) the co-ordination of activities of the ministries.

Ministry of Mines and Energy

The Ministry of Mines and Energy (MME) was created in 1960, the year after when mining and energy activities ceased to be the subject of the Ministry of Agriculture, Commerce and Public Works. The MME has 4 secretariats that propose national guidelines and policies in their areas of activity: the Secretariat of Petroleum, Natural Gas and Biofuel, the Secretariat of Geology, Mining and Mineral Transformation, the Secretariat of Electric Power, and the Secretariat of Planning and Energy Development. As its name indicates, the Secretariat of Geology, Mining and Mineral Transformation oversees the design and issusnve of overarching policies of the mining sector that the ANM must subsequently implement.

Along these lines, another function of the MME is to monitor and evaluate the performance of the geology, mining, and mineral transformation sectors, with the aim of promoting updates and corrections to existing regulatory models.

Regarding mining concessions, the MME grants and decides on the validity or expiration of mining concessions for specific substances[5] not covered by the ANM, such as metallic substances and mineral waters. Likewise, the MME grants the approval of the assignment or transfer of these mining concessions.

Secretariat of Geology, Mining and Mineral Transformation of the Ministry of Mines and Energy

The Secretariat of Geology, Mining and Mineral Transformation is the body through which the Ministry of Mines and Energy creates, co-ordinates, and implements the Brazilian mineral policy. Thus, the Ministry of Geology, Mining and Mineral Transformation evaluates the performance of the mining sector, of conducts sectoral planning studies, and of proposes actions to achieve the sustainable development of the sector. Along these lines, this Secretariat is also responsible for promoting and co-ordinating preventive and corrective actions and measures that aim to ensure rationality, good performance, technological updating, and compatibility with the environment of the activities carried out by mining companies. Likewise, this Secretariat co-ordinates the process of granting mining rights and supervises the inspection of mineral exploration and production.

Ministry of Economy (ME)

The Ministry of Economy was created in 2019 and integrated functions of the former ministries of Finance, Planning, Development and Management, Industry, Foreign Trade and Services, and Labor. Given its composition, it has a wide and diverse range of areas of competence, which range from currency and price

management, social security, to international negotiations related to foreign trade. The Ministry of Economy is also in charge of formulating national strategic planning, as well as formulating policies for the development of industry, commerce, and services. In this sense, its regulations must be consistent with the development plans and economic growth policies established by the federal government.

Special Secretariat for Social Security and Labour of the Ministry of Economy

The Special Secretariat for Social Security and Labor is one of the secretariats of the Ministry of Economy. It was created in 2019 and oversees the development and implementation of labor policies since the Ministry of Labor was eliminated the same year. In the mining sector, the Special Secretariat for Social Security and Labor is jointly responsible – together with the ANM – for regulating occupational safety and hygiene standards. The Secretariat, through teams of regional inspectors specialised in safety engineering, carries out labor inspections and imposes the corresponding sanctions.

The Secretariat of Competition Advocacy and Competitiveness of the Ministry of Economy

The Secretariat of Competition Advocacy and Competitiveness is responsible for the promotion of good regulatory practices and for the fostering better regulation in the country, including regulatory policy analyses. The Secretariat is in charge for the implementation of the Law of Economic Freedom (2019) which, among other elements, encourages the de-bureaucratisation of the public administration and the reduction of administrative burdens.

Brazilian Institute of Environment and Renewable Resources (IBAMA)

The Brazilian Institute of Environment and Natural Resources (IBAMA), created in 1989 by Law 7 735, is an autonomous federal entity linked to the Ministry of the Environment. Its main functions are: i) to exercise the power of environmental enforcement, and ii) to execute actions to enforce national environmental policies – defined by the Ministry of the Environment – related to environmental licensing, authorisation for the use of natural resources and environmental controls. Besides, IBAMA's other responsibilities are related to proposing and updating environmental quality standards, evaluating environmental standards, and generating and disseminating information related to the environment.

National Health Surveillance Agency (ANVISA)

Created in 1999 by Law 9 782, the National Health Surveillance Agency (ANVISA) is an autonomous entity that has financial and administrative independence. It is linked to the Ministry of Health. Its objective is to promote the protection of public health through the sanitary control of the preparation and commercialisation of products and services subject to sanitary regulation. Regarding the mining field, ANVISA has powers in relation to the pre-market[6] phase of drinking mineral water.

National Nuclear Energy Commission (CNEN)

The National Nuclear Energy Commission, created in 1962, is an autonomous governmental agency linked to the Ministry of Science, Technology, and Innovation. Its purposes are the following i) to collaborate in the formulation of the National Nuclear Energy Policy, ii) to carry out research, development, promotion, and provision of services related to nuclear technology and its applications for peaceful purposes and iii) regulate, license, authorise, control, and supervise this use. Regarding mining, CNEN is responsible for enforcing regulations on infrastructure and operational safety in uranium mines since the extraction of radioactive minerals is a state monopoly. CNEN provides the necessary technical standards that uranium mining operations must meet (see CNEN Resolution 28/04),[7] while ANM regulates the standards for other types of mining operations.

Geological Survey of Brazil (SGM-CPRM)

SGM-CPRM was founded in 1969 under the name of Mineral Resources Exploration Company (*Companhia de Pesquisa de Recursos Minerais* – CPRM) and, in 1994, it became the Geological Survey of Brazil,[8] a state-owned company linked to the Ministry of Mines and Energy – MME. The Geological Survey of Brazil (SGB-CPRM) is the federal agency in charge of the country's geological mapping. The geological surveys carried out by SBG-CPRM are financed with national treasury resources according to governmental programs within the Multiannual Plans (*Plano Plurianuais* – PPA).[9]

National Courts of Accounts (TCU)

TCU is the federal government's external control body and assists the National Congress in its mission to monitor the country's budgetary and financial execution and contribute to the improvement of Public Administration for the benefit of society. To this end, it aims to be a reference in promoting an effective, ethical, agile, and responsible Public Administration in Brazil. The Court is responsible for the accounting, financial, budgetary, operational, and patrimonial inspection of the country's public bodies and entities as to legality, legitimacy, and economy.

Regional institutions related to mining regulation

The 26 Brazilian states are autonomous, self-governing entities organised with complete administration branches, and relative financial independence. Despite their relative autonomy, they all have the same model of administration, as set by the Federal Constitution.

In Brazil, the Congress and federal agencies, such as ANM and IBAMA, establish the legislation and overarching mining regulations for the country. Given the federative nature of the Brazilian political organisation, the sub-national governments (i.e. states) also have competencies to establish secondary regulations regarding certain aspects of mining activities.[10]

Besides, states have agencies that overss the enforcement of federal and state regulations such as environmental standards, enviromental impact assessments, as well as safety standards and labour regulations. Therefore, there are are intersections among ANM's responsibilities and other federal agencies, and the mandates that sub national agencies have, which increases the complexity of the enforcement activities of safety, labor, and environmental standards in Brazil.

Regulatory framework in the mining sector in Brazil

General legal instruments

Figure 3.2 depicts the timeline of the general legal instruments that rule the mining sector in Brazil. As the figure show, the Federal Constitutions is the main norm that governs the mining industry by establishing the how the Brazilian Union administer mineral resources. The Mining Code of Brazil, issued in 1967, set the key regulations that are in place in the mining sectors. The regulatory framework of the mining industry in Brazil has been updated and modified throughout the years.

Constitution of the Federal Republic

The current Constitution of 1988 establishes in its Art. 20º that mineral resources, including those of the subsoil, are property of the Union. The Constitution also establishes in Art. 21º that it is the responsibility of the Union to establish the areas and conditions for the exercise of mining, in an associative manner. Likewise, Art. 22º establishes as the exclusive responsibility of the Union to legislate on deposits, mines, metallurgy, and other mineral resources, while in Art. 49 it establishes that the authorisation of research

and mineral exploitation in indigenous lands is the exclusive competence of the National Congress. Finally, Art. 176º establishes that mineral resources belong to the Union (the Federal Government), but the mined product is owned by the concessionaire.

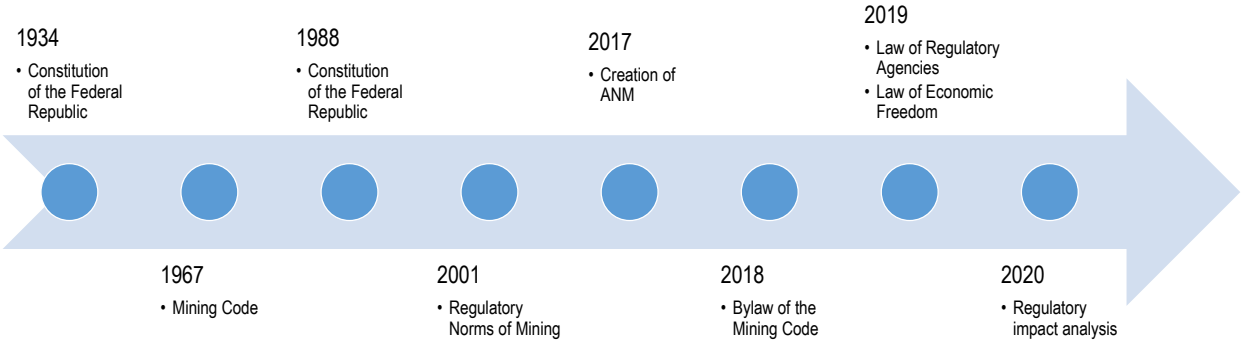
Mining Code (1967)

The Mining Code (Decree Law No. 267/67) regulates "the rights over the country's mineral resources, the regime for their use and the inspection by the Federal Government of research, mining and other aspects of the mining industry".[11] Thus, the Mining Code establishes the regimes for the use of mineral substances, the rights, and obligations of the owners of the mines and land, and the corresponding sanctions in cases of non-compliance.

Regarding mining regimes, the Mining Code establishes the existence of 5 regimes:

- The concession regime
- The authorisation regime
- The licensing regime
- The mining prospecting permit regime
- The monopolisation regime[12]

Figure 3.2. Development of the regulatory framework of the Brazilian mining industry



Regulatory Norms of Mining (NRM)

Ordinance No. 237/2001 of the former National Department of Mineral Production established the mining regulatory standards (NRM). The objective of these standards is to achieve a rational use of mineral resources. Therefore, it includes technical, environmental and safety conditions that mining operations must comply with. The NRM has 22 chapters, each of which contemplate different topics such as transportation of minerals and people, waste disposal, worker protection, lighting, and ventilation of mines, among others.

Bylaw of the Mining Code (2018)

The Bylaw of Mining Code, established in 2018 by Decree No. 9 406, regulates Decree Law No. 227/1967 – Mining Code –, Law No. 6 567, Law No. 7 805, and part of Law No. 13 575. This decree was part of the Mineral Sector Revitalization Programme initiated in July 2017 and contemplates some of the changes foreseen in the former Social Security Measure No. 790/2017.

In the four chapters contained in the decree, the schemes for the use of mineral resources, the conditions and requirements derived from each one, and the sanctions in case of non-compliance are described. In addition, the Bylaw establishes the competence of the National Mining Agency (ANM) as responsible for observing and implementing the policies and guidelines established by the Ministry of Mines and Energy and enforcing the provisions of the Mining Code and complementary regulations. Likewise, this Bylaw

stipulates two sources of income that are part of the agency's budget: the annual rate per hectare (TAH) and the costs of inspections applied to the parts inspected.

The main changes and updates introduced by the new Bylaw include the incorporation of the closure of mines as a stage of the mining activity, the express provision of the responsibility of miners in the environmental recovery of degraded areas, compliance with regulations internments for the calculation of resources and tailings, and the possibility of reuse and regulation of mining waste and tailings.

Law of Economic Freedom (2019)

The Law of Economic Freedom (Law No. 13.874/2019) derived from the Provisional Measure No. 881/19 and was enacted in September 2019. It aims at promoting business activity along with less State intervention. Art. 1 creates the Rights of Economic Freedom, which establish norms for the protection of free enterprise and the free exercise of economic activity and defines the role of the State as a legal and regulatory agent. Four principles underpin the law: i) freedom as a safeguard for the development of any business activity; ii) good faith of the individual in relation to the State; iii) the subsidiary and exceptional intervention of the State in the development of business activity; and iv) recognition of the individual's vulnerability to the State (art. 2).

In line with the promotion of private business activity, the Economic Freedom Law also includes provisions aimed at reducing bureaucracy and administrative simplification through changes in various legal provisions such as the Civil Code, the Companies Law, as well as tax, labor, and insurance regulations. Thus, for example, this law establishes the end of the need for licences for 287 economic activities defined as exhibiting low risk. Likewise, the elimination of the Company Registration Identification Number (NIRE) is established. With regard to labor regulations, this law establishes that only companies with more than 20 employees have the obligation to implement a system of daily control of the working day. The law also establishes that the existing accounting system for social security, labor, and tax obligations (e-social) be replaced by simplified system.

In addition, the law mandates that proposals or alterations to regulations must be preceded by a regulatory impact analysis (RIA) that details the potential economic impacts and assess their suitability (art. 5).

Law of Regulatory Agencies (2019)

Law No. 13 848, promulgated in June 2019, establishes the regulatory framework that supports the eleven regulatory bodies in Brazil, one of which is the National Mining Agency (ANM). In the first place, it highlights the autonomous nature of regulatory agencies in functional, decision-making, administrative, and financial matters.

It establishes that a Regulatory Impact Analysis (RIA) must precede the modifications and proposals to modify regulatory norms. RIA is a methodology for analysing the possible regulatory effects of a norm. In addition, it institutes control and supervision measures for regulatory agencies. Thus, it establishes that all agencies must develop three instruments: i) a strategic plan, ii) an annual management plan, and iii) the regulatory agenda. The first two are long-term (4 years) and short-term (1 year) planning tools, respectively, while the regulatory agenda is a planning tool that contains priority issues for the agency. In line with these control measures, Law No. 13.848 also establishes that each regulatory body must have an ombudsman and that the National Congress, under the assistance of the Federal Court of Accounts, will be in charge of external control of the regulators.

Finally, Law No. 13.848 provides for the co-operation of regulatory agencies with other agencies such as competition defense agencies, other regulatory agencies, and consumer and environmental defense agencies. The objectives of these provisions are to generate an exchange of information, standardise procedures, efficiently implement competition protection legislation, promote regulatory efficiency, ensure consumer protection, and accelerate the issuance of environmental licences.

Regulatory Impact Analysis (2020)

The Decree No. 10.411 establishes rules to apply the regulatory impact analysis (RIA) introduced in the Law of Economic Freedom and the Law of Regulatory Agencies. RIA is mandatory for all public institutions that are part of the federal administration, including autarchic and foundational entities. It describes the circumstances under which RIAs and *ex post* regulatory analyses should be carried out, as well as the content requirements and publication processes (see Box 3.1). Additionally, the Decree mandates the elaboration of an agenda of *ex post* evaluations, which should include at least one normative act and must be published in the institution's website. The agenda is expected to comprise an entire presidential term (4 years). Finally, regulatory impact analyses shall be made publicly available in each institution's website.

Law 14.066 (2020)

Law No. 14.066, enacted in October 2020, makes major changes to the National Dam Policy (Law No. 12.334), the Law of the National Environment Fund (Law No. 7.797), the National Water Resources Policy (Law No. 9.433) and the Mining Code (Law No. 227). This law increases the requirements for companies in terms of dam safety. Thus, the law prohibits the construction of dams with the upstream method and orders the dismantling of dams of this type until 25 February 2022. These policies were enacted in response to Mariana and Brumadinho's accidents. In addition, the law makes it mandatory for the Dam Safety Plan to include the use of risk analysis techniques and the development of a flood map. The new legislation also sets minimum and maximum limits for fines for non-compliance with safety standards: USD 400 and USD 200 000, respectively.

The new law also obliges mining companies to prepare an Emergency Action Plan for those responsible for mining dams. This plan must also be presented to the local population before the first filling of the dam reservoir begins. Besides, the law also determines that areas degraded by environmental accidents or disasters, such as those of Mariana and Brumadinho, are among those that have priority to receive resources from the National Environment Fund (FNMA).

In the next subsections, specific regulations applicable to different aspects of mining activities in Brazil will be analysed in more detail.

Box 3.1. Content of the regulatory impact analysis in Brazil

With the enactment of the Decree No. 10 411, institutions in Brazil are required to prepare a regulatory impact analysis of regulatory proposals, modifications, or elimination of legislations. The Decree defines the elements that a RIA study should contain, which include:

- Executive summary, objective and concise with simple and accessible language;
- Identification of the regulatory problem, including its causes and scope;
- Identification of the economic agents, users of the services and other stakeholders affected by the problem;
- Legal instruments that support the proposal;
- Definition of the objectives;
- Description of the alternative solutions to the identified problem, considering the option of not regulating and non-regulatory alternatives;
- Presentation of the potential impacts for each alternative, including regulatory costs;
- Considerations regarding information and comments that the RIA received during a stakeholder engagement processes;

- Mapping of the international experience regarding the measures chosen for solving the regulatory problem;
- Identification and definition of the effects and risks of drafting, changing or eliminating the normative act;
- Comparison of the considered alternatives, including an analysis that describes the methodology chosen for each specific case and the alternative or combination of alternatives suggested and that it is considered the most adequate one for solving the regulatory problem and achieving the objectives; and
- Description of the implementation strategy of the suggested alternative, including monitoring and evaluation measures.

Source: Decree No. 10.411/2020.

Regulations to foster the geological potential of Brazil

Geological surveys in Brazil have a relevant role in providing data to improve the capabilities of prospectors, junior mineral exploration companies, and major mining companies to find new mineral deposits. They provide essential data that constitutes one of the bases for supporting the regulatory framework of the mining sector

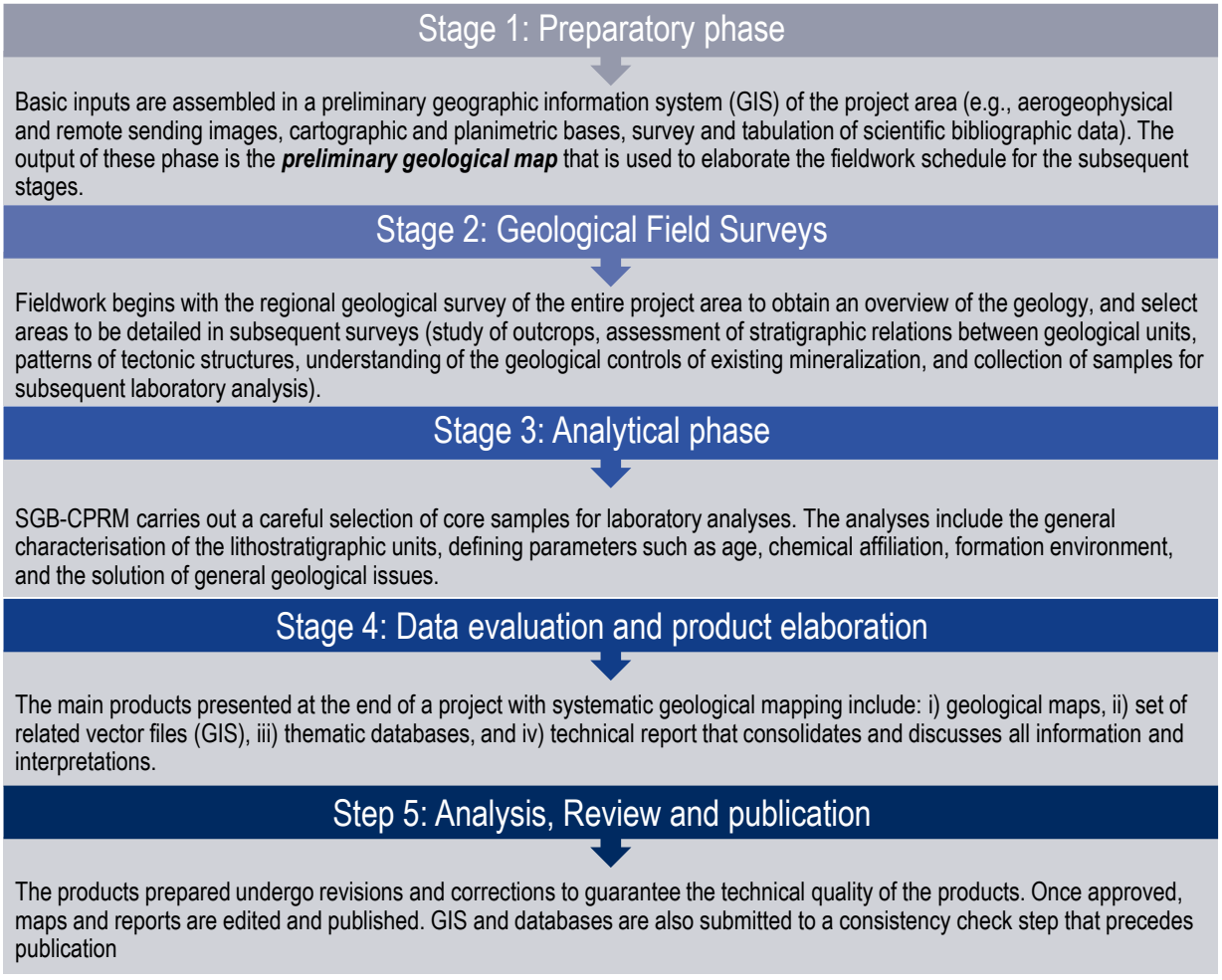
The *Geological Survey of Brazil* (SGB-CPRM) is the federal agency in charge of the country's geological mapping. At the state level, currently there are no substantial initiatives regarding the development of geological cartography projects. Conducting *geological surveys*, understood as geological mapping over the territory, represent one of the primary statutory tasks of the SGB-CPRM.

The geological surveys carried out by SBG-CPRM are financed with national treasury resources according to government programs within the Multiannual Plans (PPA).[13] SGB-CPRM's Directorate of Geology of Mineral Resources, through the Department of Geology, is responsible for carrying out the geological mapping programs at the agency.

SGB-CPRM geological mapping projects are defined, in general, during the planning stage of the PPAs, when the areas to be mapped during the four-year period covered by the programs are defined. The selection of land areas for geological mapping projects in SGB-CPRM is based, fundamentally, on the strategic importance of each area, considering its mineral potential and level of previous geological knowledge. The boundaries of such areas are defined, in general, by the limits of map sheets derived from the International Map of the World on the Millionth Scale.

The mapping of consolidated mineral provinces, such as the Carajás Mineral Province (Pará state) and the Iron Quadrangle (Minas Gerais state), as well as emerging ones, such as the Juruena-Teles Pires Province (Mato Grosso state), is considered strategic. Through these geological surveys, the SGB-CPRM aims to provide data and information to foster investments in the Brazilian mining sector in the various regions of the country. The geological mapping projects of SGM-CPRM comprise five stage, which are summarised in Figure 3.3.

Figure 3.3. Process to conduct geological surveys in Brazil



Source: Decree Law No. 764/1969, Law No. 8.970/1994 and its bylaw (Decree No. 1.524/1995), Technical Procedures Guides for Geological Cartography of the Geological Survey of Brazil.

In general, the consolidated or emerging mineral provinces have a good level of geological knowledge when compared to vast areas of the Brazilian territory where the geological knowledge is immature and compatible with the scale of regional recognition. These areas are located mainly in the Amazon Region, and commonly incorporate indigenous lands and environmental conservation units.[14]

In this process, ANM can provide access to mining companies' geological data, if there is an agreement between parties, since the result of the mineral exploration activities presented to ANM in the Final Exploration Report (*Relatório Final de Pesquisa* – RFP) are classified. Therefore, these data are not, in general, shared with SGB-CPRM. Box 3.2 summarises how ANM manages the geological data of mining companies that hold mineral exploration titles.

With respect to the geological data administration, SGB-CPRM uses desktop applications to feed thematic databases[15] which are migrated to a database system. Currently, all databases in this company are being reviewed and restructured, and a more versatile data entry application is being developed. Regarding the geological data administration, SGB-CPRM uses desktop applications to feed thematic databases which are migrated to a database system. Currently, all databases in this company are being reviewed and restructured, and a more versatile data entry application is being developed.

Box 3.2. ANM's management of geological data from exploration mining companies

According to the Mining Code, when concluding the exploration stage, all exploration permit holders must submit to ANM the Final Exploration Report (RFP), which can be assessed as positive (if a mineral deposit with economic perspectives was identified) or negative (if no mineral deposits were identified during exploration). A positive RFP must indicate the geological characteristics of the deposits and the quantities of mineral resources. The geological data contained in RFP are not made available to the public. These reports are submitted to the ANM through a filing system but are not stored in digital databases.

Source: Brazilian Mining Code (Decree Law No. 267/1967).

After the publication of the survey projects' products, SGB-CPRM conducts several transparency initiatives in order to generate a wide dissemination of the geological information, such as launch events, lectures at technical-scientific events or conferences when requested by interested parties.

Finally, it is important to point out that in Brazil geological data collected through surveys may be used to define mining concessions. They are made publicly available for multiple uses, including private parties to define areas of interest requested to ANM. In this sense, ANM has no role in the management of geological surveys, which are mainly carried out by SGB-CPRM.

Regulating the access to mineral resources in Brazil

ANM has a key role in granting mining titles for large, middle-tier, and artisanal small-scale mining activities. Currently, the authorisation and concession regimes are not consolidated into one streamlined integrated process that may benefit interested parties by reducing administrative burdens and the time to obtain mining permits. Likewise, ANM does not have any power to oversee the authorisation of mineral smelting and refining activities.

According to Article 176º of the Federal Constitution of Brazil, mineral resources belong to the Union and its property is distinct from that of the surface. Article 2º of the Mining Code (Decree Law No. 227/1967) establishes the legal procedures to access minerals (referred to as mineral substances in Brazilian legislation), which comprise the regimes of authorisation, concession, licensing, artisanal mining permitting, and monopolisation of radioactive minerals. ANM has a central role in the regulatory process for the management of mineral titles' requests in Brazil. According to item § 2, article 3 of the Mining Code, it is the responsibility of the former National Department of Mineral Production (DNPM), succeeded by ANM, to execute the Code and its complementary regulations.

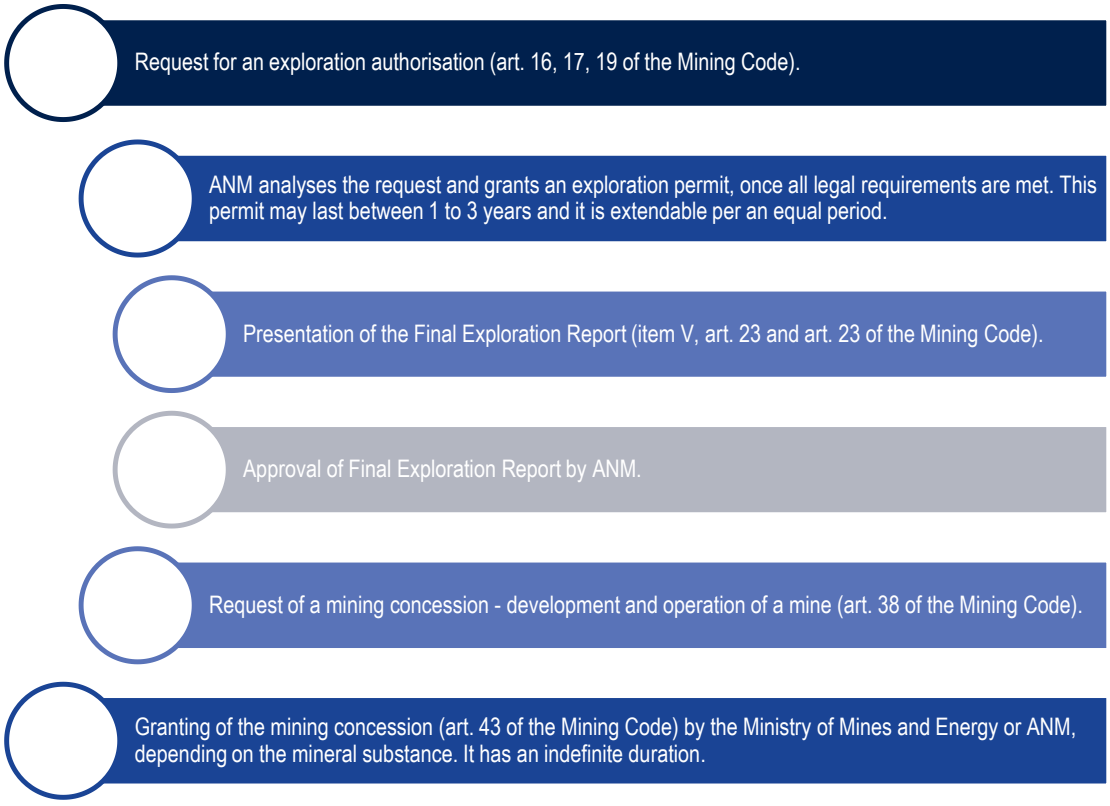
The Authorisation and Concession Regimes are applicable to any mineral substances and can be approached as a single regime, since they are sequential, and the former depends on the latter. The rules and procedures for these regimes are laid out in the Mining Code. The authorisation regime applies to the mineral exploration stage and the concession regime to mineral production. The process of obtaining a mining title within the authorisation and concession regimes is described in the Mining Code and the Decree No. 9.406/2018 (*Regulamento do Código de Mineração*, NRCM). This is summarised in Figure 3.4.

On the other hand, the Licensing Regime is applicable to mineral substances that can be directly mined without an exploration phase. The rules and procedures for this regime, including the mineral substances that can be subject to it, are established in Law No. 6.567/1978.[16] The range of duration of licensing title can be between 1 to 20 years. Under this regime, mineral resources can only be exploited by the owners of the property or by those who have their express authorisation (Art. 2o of the law).

The Artisanal Mining Permit Regime is ruled by Law No. 7.805/1989 and regulates the extraction of specific mineral substances (such as gold and precious gems). Its main characteristic is that it is intendeds to support a category of miners known as *garimpeiros*. These artisanal miners can work individually or associated in cooperatives.[17] The permit is granted for 5 years and can be successively renewed at the discretion of ANM (item I, article 5o of Law No. 7.805/1989).

The Monopolization Regime underpins the exploration, exploitation or processing, and commercialisation of nuclear minerals and its derivatives. The National Mining Agency does not regulate these mineral substances as they are part of a Federal monopoly.

Figure 3.4. Summary of the authorisation and concessions regimes in Brazil



Source: Brazilian Mining Code (Decree Law No. 267/1967) and Decree No. 9.406/2018.

Finally, in addition to these regimes, there is the Extraction Register regulated by ANM Resolution No. 01/2018. This regime allows bodies of municipal, state, and federal administration to extract mineral substances for immediate use in civil construction works directly executed by them.

The authorisation permit is an exploration title.[18] The mining concession, licensing and artisanal mining permits are titles that cover mining and processing activities. In addition to the mining title areas, ANM, on request, may constitute easement areas (*áreas de servidão*), which allow concessionaires to use portions or strips of land for auxiliary mine installations, such as piles, tailings dams, roads, or pipelines. All mining titles are negotiable, and the titles' transfers must be registered by ANM. The rules for obtaining ownership are the same for the authorisation and concession permit, the licensing and the artisanal mining permit and are summarised in Figure 3.5.

Figure 3.5. Rules for obtaining ownership of mining areas in Brazil

A. Rules on access to free areas

- In accordance with article 18º of the Mining Code. The access to free areas works on a first-come-first-served basis which is known as priority right.

B. Rules on access to areas made available due to irregularities committed by previous holders of mining titles

- In accordance with articles 26º, 32º and 65º of the Mining Code, regulated by article 45º of Decree Nº 9.406/2018, and ANM Resolution Nº 24 of February 3, 2020.

C. Rules on access to areas through the transfer of mining titles

- Acquisition provided for item §3, Article 176, of the Brazilian Federal Constitution.
- Rules detailed in Articles 224º to 250º of the DNPM's Normative Consolidation (DNPM Ordinance Nº 155 of May 12, 2016).

Source: Brazilian Mining Code (Decree Law No. 267/1967), Decree No. 9.406/2018, DNPM Ordinance No. 155 /2016, Federal Constitution of Brazil and ANM Resolution No. 24/2020.

Besides the mining easement, ANM can also approve the delimitation of areas and declare public utility for expropriation purposes, according to item XXI, Article 2º of Law No. 13.575/2017.

In Brazil, a mining concession[19] can cease for the following causes: a) expiry/forfeiture of the concession, b) express waiver of the concession, c) mineral depletion. Article 65 of the Mining Code establishes the situations in which the expiry of an exploration permit or a mining concession shall be declared by ANM.

It should be noted that ANM has no legal mandate to grant metal smelting and refining authorisations and only grants titles for exploration and mining activities (including ore concentration and processing). There are other governmental institutions involved in the process of granting mineral titles. Figure 3.6 summarises this institutional framework and shows a variety of entities in Brazil that comprise a network of federal and local authorities with power to approve or deny the granting of mining titles and environmental instruments for mineral extraction and processing. These institutions establish different layers of regulations which overlap with each other, making complex the granting of mining titles.

In general, Brazilian or foreign investors are treated alike in the process of granting mineral titles.[20] Both agents may constitute companies under Brazilian law and have their headquarters and administration in the country.

For mining titles of concessions located in the borderland strip (Law No. 6.634/1979) or indigenous lands (item § 3, Article 231, Federal Constitution) there are special provisions in place. In the first case, there are special rules to grant titles on the borders for national security reasons, while in the second case granting mining titles is prohibited because the legal framework does not allow it. It should be noted that mining on indigenous lands has not yet been regulated and is therefore illegal.

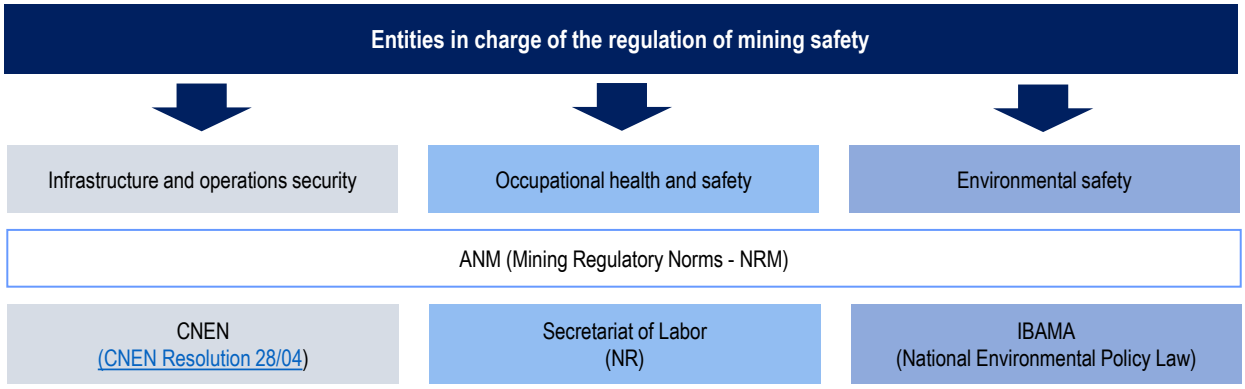
Figure 3.6. Other institutions involved in the process of granting mining titles in Brazil

Source: ANM.

Mining safety and health regulations in Brazil

In Brazil, the mortality rates in the mining sector (due to accidents at work) are larger compared to other economic sectors (Parreiras de Faria and Dwyer, 2013[2]). The agency in charge of enforcing safety regulations in the mining industry is the National Mining Agency (ANM). This entity oversees the regulation and enforcement of mining safety standards. Regarding mining safety, ANM has regulatory, supervisory, monitoring, and sanctioning functions. ANM has the legal mandate to enforce the Mining Regulatory Norms (*Normas Reguladoras de Mineração* – NRM).[21] Nevertheless, an overview of mining safety regulation in Brazil shows that there are overlaps among ANM's safety regulatory responsibilities and the legal mandates of other entities (see Figure 3.7).

Figure 3.7. Co-responsibilities on safety regulations in Brazil



Concerning regulations on mining infrastructure and operational safety, ANM is co-responsible with the National Nuclear Energy Commission (*Comissão Nacional de Energia Nuclear* – CNEN) of enforcing these regulations. CNEN provides the necessary technical standards that uranium mining operations must meet (see CNEN Resolution No. 28/04),[22] while ANM regulates the standards for other types of mining operations.

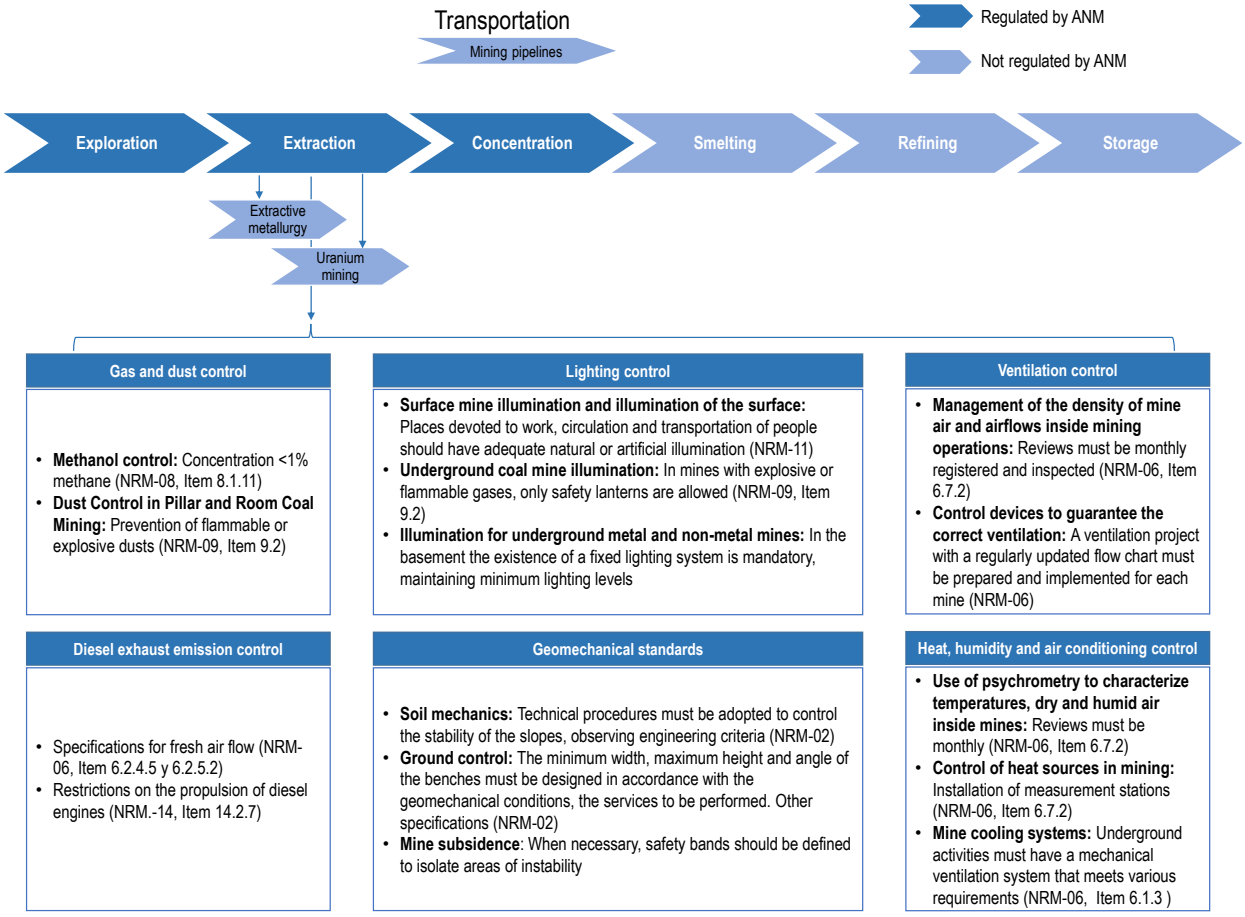
With respect to environmental regulations, the norms for environmental protection are established in the National Environmental Policy Law, which are not under ANM's regulatory scope. However, Law No. 13.575/2017 establishes that ANM shares the responsibility with IBAMA (*Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis*) to conduct inspections for environmental and safety

controls. At the state level, there are several secretariats of environments that grant environmental permits for mining operations and enforce state regulations to protect the environment.[23]

Besides, ANM's safety regulatory and supervisory functions do not cover all relevant aspects of mining sector. As Figure 3.8 shows, ANM does not regulate some phases of the mining value chain, such as extractive metallurgy, smelting and refining. Likewise, it does not have any scope in the regulation of uranium mining, on the grounds that it is a state monopoly. Similarly, as Figure 3.9 shows, this agency has no competence on some auxiliary mining activities, such as water management control systems.

Finally, regarding occupational health, hygiene, and labour safety standards applicable to the mining sector, ANM and the Ministry of Economy share regulatory and supervisory powers. The responsibility for regulating occupational health, hygiene, and labour safety standards is shared between ANM and the Special Secretariat for Social Security and Labour of the Ministry of Economy (SSSL-ME). In Brazil, regulations applicable to occupational safety in general have the legal support of Law No. 6.514/1977. Currently, there are 37 Regulatory Standards (NR), aligned to this labour law. The regulatory standard NR-22, approved by Ordinance MT No. 3.214/1978, establishes the regulation of occupational safety and health for mining companies.

Figure 3.8. Summary of safety regulations in the mining value chain in Brazil

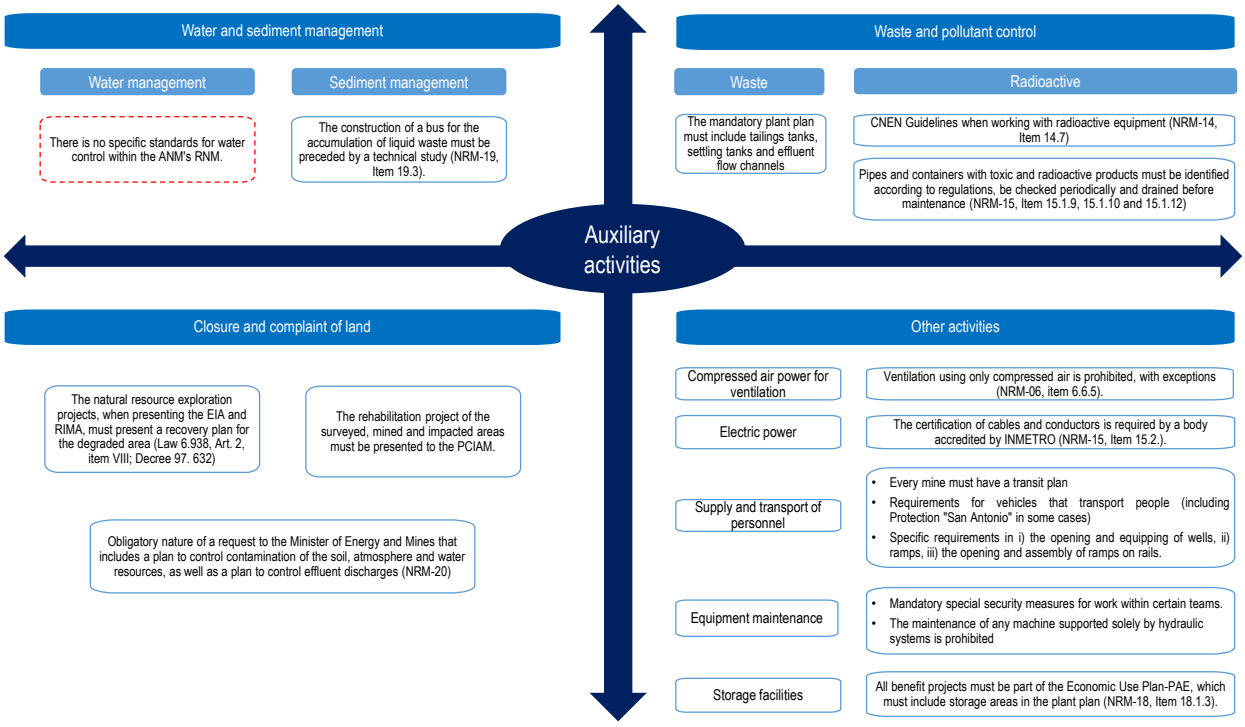


Source: NRM-02,NRM-06, NRM-08, NRM-09, NRM-11, NRM-14.

Brazil also has legislation on underground mining that restricts the daily working hours of miners to 6 hours and 36 hours per week, which can be extended, exceptionally, to 8 hours per day and 48 hours per week (see Articles 293º to 301º of Decree Law No. 5.452/1943 – Consolidation of Labour Laws).

Currently, two legal frameworks, one of the Ministry of Economy and one of ANM, are applied for the supervision and enforcement of mining health and labour safety standards.[24] Thus, there are two institutions that carry out labour safety regulations in the mining sector. On the one hand, ANM monitors the compliance of the NRMs. On the other hand, the SSSL-ME monitors the compliance of the NRs. Figure 3.10 shows the process by which this regulatory duplication arises (two entities regulating on the same matter).

Figure 3.9. Summary of auxiliary mining activities regulated in Brazil



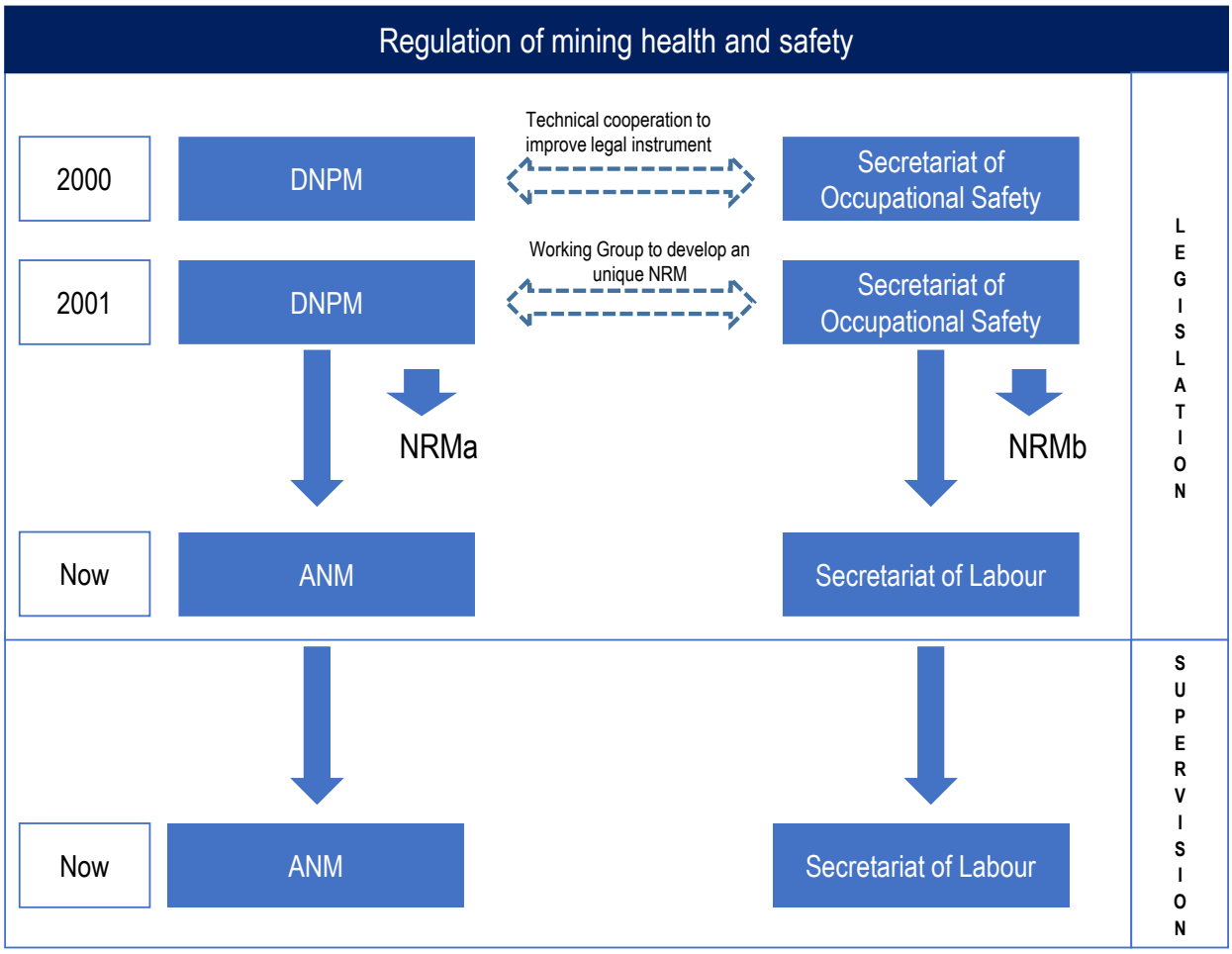
Source: NRM-06, NRM-14, NRM-15, NRM-18, NRM-19, NRM-20; Law 6.938/1981; Decree 97.632/1989.

In 2000, DNMP and the former Ministry of Labour and Employment (with its Secretariat of Occupational Safety) tried to solve this issue, starting a technical co-operation to review and improve legal instruments. A year later, a working group was formed to develop a common NRM for both institutions. However, it was not possible in the end to publish a common standard and each institution published their own. From then until now both institutions have overseen health and safety supervisory activities in the mining industry.

Finally, it is important to note that mineral water production might generate high risks for human health if not properly regulated and has received much attention over the past years. Regarding drinking mineral water, ANM grants permits to extract this kind of water, while ANVISA (National Health Surveillance Agency) verifies the maximum levels of contaminants in mineral water and supervises its labelling to protect the health of consumers.

ANVISA also performs health inspections to verify the compliance of industrial regulations to process mineral water by extractors. Municipalities grant health licences to process mineral water, and they perform health inspections and enforce safety and health regulations. ANVISA complements the work of local governments by issuing health and safety norms to produce mineral water that are related to the microbiological quality of water, the correct labelling of mineral water, and the maximum levels of contaminants. ANVISA co-ordinates with local and state health agencies, as well as ANM regional units to perform water quality, health, and safety inspections.

Figure 3.10. Relevant actors for the regulation and supervision of mining labour safety standards in Brazil



Other relevant policy documents and regulations

In September 2020, the Ministry of Mines and Energy published the Mining and Development Programme (PMD) 2020-23 (Ordinance MME No. 354/2020), which defines a series of actions to harness Brazil's mineral resources and increase the country's development. The PMD is the umbrella document for mining policy in Brazil. It acknowledges the role that mining activities play as a driver for economic growth and the importance of encouraging the development of activities that are social, economic and environmentally sustainable. The programme includes 10 key topics that are relevant for the sector and details 110 goals to be achieved by 2023. The themes covered in the document range from mining in society to more technical topics such as increasing geological knowledge. The following list describes the ten subsections of the programme.

- Improving the economic knowledge on the mineral sector
- Socioeconomic and environmental commitment to mining
- Increasing geological knowledge in mining
- Expansion of mining to new areas
- Investment in the mineral sector
- Selectivity of actions for the sector

- Governance in mining
- Management and efficiency
- Combating illicit practices in mineral activities
- Mining in society

The role of the Brazilian government in the regulation fo artisanal small-scale mining activities

Formal artisanal small-scale mining activities (ASM)

ANM has specific rules for granting titles for ASM concessions established by Law 7.805/1989 and Decree No. 9.406/2018. ANM grants a mining permit to *garimpeiros* (small miners) or mining cooperatives (unions). Resolution No. 178/2004 determines criteria and procedures for artisanal miners to require the mining permit from ANM (*Permissão de Lavra Garmpeira*, PLG). The garimpo mining permit limits the land that can be granted to 50 hectares for an individual miner and 1 000 hectares for a garimpeiro cooperative. This permit is valid for five years and requires an environmental licence, granted by IBAMA or the subnational environmental agency designated by IBAMA. This special permit can be successively renewed at the discretion of ANM (item I, article 5 of Law No. 7.805/1989).[25]

Safety standards for ASM operations are the same as those applicable to large mines, which are not necessarily adequate to deal with atomised operations spread across large areas of the Amazon basin. Although Brazil has specific rules for ASM concessions and title granting (Law No. 7.805/1989 and Decree No. 9.406/2018), it does not have explicit safety and environmental regulations to manage artisanal mining activities. The legislation in place is not orientated to prevent pollution nor reduces safety risks related to a mismanagement of the extraction of alluvial ores and the beneficiation of precious metals (e.g., gold), gems (e.g., diamonds), and aggregate materials for construction. On the other hand, in Brazil occupational health and work safety legislation does not cover *garimpeiros* (i.e., ore diggers, artisanal mining workers) as these are governed by their own legislation and not by labour standards because *garimpeiros* are not considered employees. This fact causes a great distortion in work relations, leading to the occurrence of degrading work situations that are of concern from a social and environmental point of view.

Informal and illegal mining activities

The Brazilian legislation does not define informal mining, which makes difficult to deploy policies and budgetary resources to formalise *garimpeiros* that do not comply with some regulations. The term informal mining describes locally based and small-scale exploration and extraction activities of precious and base metals, precious stones, and gems, as well as construction aggregates that may not abide by all the legal formalities corresponding to a licensed mining activity.[26] The term *informal* denotes mining by individuals, groups and cooperatives that is carried out without the compliance of all formal regulations imposed by the State.[27]

In an attempt to formalise informal *garimpeiros*, in 2008 the Brazilian Congress passed Law No. 11.685/2008 – the Statute of the Garimpeiro (*Estatuto do Garimpeiro*) – that stipulates the rights and obligations of small miners. These comprise the requirements to recover the areas negatively affected by the mining activity, to comply with all labour safety and health regulations, as well as to prevent child labor. However, *garimpeiros* seem to face difficulties in having the necessary means to compensate the environmental damage caused by their operations, and thus they are unlikely to be eligible for an environmental licence, leaving them in the informality. The Ministry of Mines and Energy and ANM are expected to work together to foster the formalisation of informal miners, establishing a policy agenda regarding this point.

On the other hand, regarding illegal mining activities, there is a policy gap on sustained governmental actions to tackle illegal miners. In Brazil, there is no distinction between informal and illegal mining like it is observed in other jurisdictions in Latin America, such as Peru.[28] There is only the definition of illegal artisanal mining, which is understood in Brazil as mining activities performed on indigenous land or reserved areas.[29]

Both the public opinion and the government have expressed their concerns regarding the adverse environmental impacts and criminal activities related to illegal mining. Nonetheless, the administration has not perused sustained actions to fight illegal miners. Just recently the issue has been included in the agenda of the National Council for the Legal Amazon, established by Decree No. 10.239/2020 under the co-ordination of the Vice President of the Republic.[30]

The Brazilian authorities have applied a combination of policies to deal with illegal mining extraction with some intersectoral articulation. This includes campaigns that ANM deploys to promote mining cooperatives among small miners. These cooperatives can induce the formalisation of small operations by creating a value chain around mineral processing, especially in the case of the extraction of aggregates, clay, gold, and diamonds. Another policy comprises banning measures, such as the arrest of illegal miners and the destruction of mining equipment, carried out by the Federal Police. However, there are no sustained and systematic efforts by ANM, the Ministry of Mines and Energy, and other government agencies, to address the issue of illegal mining, either at a small or large scale.

A key element for such efforts will be the availability and access to better information and intelligence to tackle effectively illegal miners. Regulatory authorities, such as ANM, and the Federal Police identify illegal mining operations only when they receive a complaint. At such point, it might be too late because the illegal extraction might have already affected fragile areas such as the Amazon territories.

The relation between taxation and mining regulations in Brazil

The tax system and fiscal contributions regime applied to the mining industry in Brazil are quite complex. In this system, ANM carries out the collection of a financial compensation for the exploitation of mineral products as well as an annual fee per hectare in each mining concession.

In Brazil, mineral resources belong to the Federal Union. To extract and exploit these resources, mining companies need to have a permission from the Federal Government and pay general and specific taxes. Brazil has a vast and quite complex tax system, comprising taxes overlapping at the municipal, state, and federal levels. The number of taxes and governmental levies are extensive for the mining sector. Even though the Federal Government and the Congress have attempted to simplify taxation in Brazil, a large body of tax regulations remains in force. Regarding real taxes, mining companies follow the general and complex tax rules as companies in other industries do.

Mineral exports are exempt from the Tax on Circulation of Goods and Services (ICMS for its acronym in Portuguese), which is established by Complementary Law No. 87/1996 (also known as the Kandir Act). ICMS is due to the state governments. For this reason, the law has always caused controversy among governors of exporting states, who claim the loss of fiscal revenues due to the tax exemption on exports of mineral products from their jurisdictions. Likewise, the exemption also causes price distortions such as the observation of mineral products sold abroad at lower prices than the quotations of products sold in the domestic market. On the other hand, import duties applicable to the mining industry follow the same rules as the ones established at the federal level, usually with high rates, but with some exemptions, being quite complex in general.

The Brazilian Constitution establishes a financial compensation to the Union for the exploitation of mineral resources. This compensation is known in Brazilian legislation as the Financial Compensation for Mineral Exploitation (CFEM for its acronym in Portuguese). Laws No. 7.990/1989, No. 8.001/1990 and

No. 13.540/2017 regulate the CFEM and it is administered by ANM. CFEM is not legally considered a tax, but rather a public contribution that is levied on mining outputs (sale, transformation, and consumption).

CFEM maximum rate is 4% of gross mining income after taxes. The specific rates for each type of mineral product are listed in the annex of Law No. 13.540/2017. ANM is entitled to 7% of the total amount of CFEM collected during a fiscal year. For the small-scale artisanal mining regime, CFEM is not due by the producer, but by the first buyer of the mineral product.

In addition, mining companies may also pay the Property Tax, Urban Territorial Tax (IPTU), and the Tax on Rural Territorial Property (ITR). These taxes are payable by the landowner, who under the current Brazilian legislation may not be a miner. Several mining projects are in rural areas, and the ITR is exempt for properties with less than 30 hectares.

There are no fees for land use due to the Brazilian Union during the mining phase. However, in the exploration phase (that can last up to three years or more if a renewal of a mining exploration permit is granted), the Annual Fee per Hectare (TAH) is due and charged annually proportionally to the concession area of each permit. The TAH value is BRL 3.29 (USD 0.59) per hectare and may increase to BRL 5.00 (USD 0.90) if there is an extension of the exploration permit term.

ANM is responsible for supervising the collection of CFEM, TAH, and fines and emoluments imposed to mining companies according to the provisions of the Mining Code. For these purposes, ANM conducts periodic inspections in the mining companies' accounting records.

The CFEM collected goes to the Brazilian National Treasury, but ANM distributes the CFM proceeds among sub-national governments, and other governmental institutions. The collected revenues are distributed according to the percentage established by Law No. 13.540/2017.

Regulation of mineral pipelines

In Brazil, transportation in the mining industry is regulated by the NRM. However, the rules for this activity are few when it comes to pipelines and non-existent when it comes to mineral pipelines specifically. The NRM covers pipelines in general, without making distinctions for mineral or mud pipelines. Thus, the regulations require that the pipes be dimensioned and installed with the appropriate safety measures to guarantee their perfect operation (NRM-12, item 12.1) and that the pipelines transporting toxic, dangerous or flammable products are identified in accordance with the current regulations (NRM-15, Item 15.1.9).

Current regulations in force do not establish technical standards that mining pipelines must comply with. This may generate unnecessary risks in transportation of mineral concentrates and slurries, not only for the environment but also for the health of the populations surrounding the transportation route, since mineral spill accidents and concentrates leakages due to the rupture of mining pipelines are not uncommon. Box 3.3 describes the case of the accident in the Antamina's concentrates pipeline in Peru as an example.

Box 3.3. The Antamina's mineral pipeline accident in the Peruvian Highlands

In Peru, in 2012, an explosion occurred in a mineral pipeline belonging to the mining company Antamina, one of the largest copper-zinc producers in the world. The accident caused the contamination of the Fortaleza river and of cultivated soils, the death of one person and the intoxication of 111 people.[1] At the time of the explosion, company personnel requested the support of community members to contain the spill and did not provide any protective equipment. This situation revealed the great regulatory gap in the auxiliary transportation activity, since the company did not have trained personnel, did not have an action plan or protocols for spill emergencies and there was no adequate control of the transfer of concentrates by any state authority. Two years after this accident, the Peruvian Ministry of

Energy and Mines enacted the Environmental Protection and Management Regulations for Mining Exploitation, Benefit, General Labor, Transportation and Storage Activities (Supreme Decree No. 040-2014-EM).[2] These regulations establish the minimum environmental measures and safety standards that mining companies must comply regarding the management of mineral pipelines.

1. See Situation Report No. 880-27/07/2012-COEN-INDECI (Report N ° 05). Retrieved from https://www.ocmal.org/derrame-por-rotura-de-mineroducto-intoxica-comuneros-entre-ellos-una-gestante/ (accessed 3 October 2020).
2. Available at http://www.minem.gob.pe/archivos/DS-040-2014-EM_mineria-azoz5k40kwbg4.pdf.
Source: Supreme Decree No. 040-2014-EM.

Regulation of other segments of the mining value chain

ANM does not have an integrated regulatory control of the entire value chain of the mining industry. Thus, ANM does not regulate safety standards in some phases of the mining sector, such as extractive metallurgy, smelting and refining. Currently, there are no clear regulatory rules for these activities.

According to Ordinance 12/2002/DNPM/ MME, "the NRMs applies to all mineral research activities, mining, mineral processing, distribution and sale of minerals" (Item 1.3.1). For this reason, all those agents who are dedicated to these activities are obliged to facilitate the inspection of the facilities, equipment, works and other areas (NRM-01, Item 1.6.1). As shown in Figure 3.8, regulatory standards issued and supervised by the mining authority are not applicable to smelting or refining processes. Also, extractive metallurgy, concentrates and metals storage, and trading are not within the mandate of ANM either.

In Brazil there are no specific rules for these activities under the regulatory scope of ANM. This represents an important gap in the regulation of mining safety, since these activities are characterised by the use of intense chemical treatment processes that implies a high consumption of water and energy, as well as the generation of complex and potentially dangerous waste. For example, in foundries, the industrial activity with the highest mortality rate, there is a permanent risk of damage to the environment, health and safety. Indeed, foundries are related to emissions in the atmosphere (sulfur oxide, carbon monoxide, dust, and particulate matter), solid waste (residual sand, slag), sewage and noise. Similarly, workers in smelting complexes can be affected by physical hazards, respiratory hazards, occupational risks, and explosions (IFC, 2007[3]).

These activities, dangerous by nature, are riskier without a regulatory oversight that enforce minimum requirements for their operation. In this sense, the development of regulations applicable to extractive metallurgy, smelting and refining, as well as the expansion of ANM's scope of supervision to these activities, is considered necessary in the future. ANM's situation contrasts with the cases of Chile and Peru, which are described in Box 3.4.

Box 3.4. Regulation of the mineral value chain in Chile and Peru

In Chile, the Mining Safety Regulation (Supreme Decree No. 132/2002) establishes, among other things, that every mineral treatment plant has safety procedures in place in cases of emergency. All the mining value chain (including smelting, refining, mineral storage, and trading) in Chile is integrally regulated by the National Service of Geology and Mining (*Servicio Nacional de Geología y Minería*, SERNAGEOMIN). Regarding the case of Peru, Law No. 29.901 and the Supreme Decree No. 088-2013-EM (Annex 2) establish that the Peruvian Supervisory Agency of Energy and Mining of Peru (OSINERGMIN) has the exclusive competency to monitor and enforce mining technical safety regulations over the whole mineral value chain (including exploration, extraction, concentration, beneficiation, transportation, and storage of mining products). Its scope considers the middle-tier and large mining operations.

Source: Supreme Decree No. 132/2002 (Chile), Law No. 29.901 and Supreme Decree No. 088-2013-EM (Peru).

Implementation and enforcement of the regulatory framework of the mining sector in Brazil

Reforms in the mining regulatory framework

Improvements of the regulatory framework on tailings dams' safety

In Brazil, the National Dam Safety Policy, established by Law No. 12.334/2010, states that the operator of a dam is legally responsible for the safety of the infrastructure. The ABNT/NBR Technical Standard No. 13.028/2017 regulates the safety of dams and specifies the minimum requirements for the preparation and presentation of mining dam slats. CNRH Resolution No. 143/2012 also establishes general criteria for classifying dams by risk category, potential damage associated to it and by the volume of the reservoir (the tailings pond).[31]

Much of the current regulations and policy innovations regarding the safety of tailings dams in Brazil has been issued in response to the accidents caused by the detachment of these structures. Two accidents had the greatest impact on the legislation: Mariana (2015) and Brumadinho (2019). Box 3.5 describes both accidents. These two dam failures in such a short period increased public concerns over the safety of tailings dams; in particular, those that have been declared inactive (MDNP, 2020[4]).

Box 3.5. The Mariana and Brumadinho tailings dams' accidents in Brazil

The Mariana accident in the town of Bento Rodrigues of Minas Gerais corresponds to a failure of the Mariana mine's tailings dam in 2015. The accident involved Samarco Mineração mining company S.A., a joint venture of Vale and BHP Billington. The accident caused the spill of 33 million cubic meters of iron waste, the contamination of 620 km of waterways along Doce River and the death of 19 people. In 2016, Samarco reached a deal with the Brazilian government to pay up to BRL 24 billion (USD 6.2 billion) over the Mariana dam collapse.

The Brumadinho accident occurred in Minas Gerais and comprised the rupture of the Córrego de Feijão mine's tailings dam in 2019. The accident involved Vale mining company. The dam failure released 12 million cubic meters of iron ore tailings. The dam's collapse also caused damage to the surrounding environment including irreparable pollution of the entire Doce River basin. Two hundred and fifty deaths were recorded and 20 disappeared in this accident.

Brazilian environmental agency IBAMA fined Vale S.A. BRL 250 million (USD 66.32 million) for various violations related to a tailings dam that burst at its Córrego de Feijão iron ore mine in 2019. Vale and the attorney general's office (AGU) reached an agreement on environmental compensation linked to the January 2019 collapse of a tailings dam in Brumadinho, Minas Gerais state. The company will pay a total of BRL 250 million reais (USD 47.2 million) in compensation related to fines imposed by environmental regulator IBAMA and Minas Gerais state.

In February 2021, the Brazilian government and Vale settled that the company pays a total of USD 7 billion as a compensation for social and environmental damages caused by the Brumadinho disaster. Thirty per cent of the settlement will be invested in the city of Brumadinho.

Source: IBAMA (2019[5]), *Ibama multa Vale em R$ 250 milhões por catástrofe em Brumadinho (MG)*, http://www.ibama.gov.br/noticias/730-2019/1879-ibama-multa-vale-em-r-250-milhoes-por-catastrofe-em-brumadinho-mg (accessed 23 September 2021); Globo (2015[6]), Samarco é notificada por governo de MG a pagar multa de R$ 112 milhões – notícias em Desastre Ambiental em Mariana", http://g1.globo.com/minas-gerais/desastre-ambiental-em-mariana/noticia/2015/11/samarco-e-notificada-por-governo-de-mg-pagar-multa-de-r-112-milhoes.html (accessed 23 September 2021).

There are high risks related to the safety of tailings dams. This topic has pushed the Brazilian mining industry and the mining sector worldwide to ensure adequate management measures to guarantee high levels of safety and environmental protection. A strong criticism coming from the civil society and industry associations was the lack of sufficient inspection of the tailings dams. To tackle this criticism, the Brazilian government conducted a process of revisions of the regulations in an effort to improve and align them with international best practices.

After the accident of Mariana, the former DNPM issued Ordinance No. 70.389/2017 that modified the National Registry of Mining Dams, reviewed the classification criteria for tailings dams, and revised the requirements of the emergency action plan.[32] In addition, the SIGBM[33] (*Sistema Integrado de Gestão de Segurança de Barragens de Mineração* or the Integrated System for the Management of Mining Dams Safety) was established, allowing remote supervision of the safety of the dams by ANM. This is a unique online database that provides ANM and the public with access to key information on each registered tailings dam in the country. Likewise, the ordinance ordered the performance of mandatory periodic safety reviews of the dams (RPSB) based on their risk classification. Every six months, the standard provides for the mandatory regular safety inspection, with the issuance of a Declaration of Stability Condition for each mining dam prepared by a qualified professional. Dams that do not have the DCE or those whose respective stability studies do not guarantee the safety of the structure are immediately banned.

Shortly after the Brumadinho disaster, the Federal Government instituted, by Decree No. 9.691/2019, the Ministerial Council for Supervision of Disaster Response and the Management and Evaluation Committee for Disaster Response, with the participation of several federal public agencies. The Council had the objective of accompanying the actions of relief, assistance, reestablishment of affected essential services, recovery of ecosystems and reconstruction resulting from the disaster. In addition, it required regulatory agencies to inspect all dams with high associated potential damage, which contributed to reducing the population's apprehension about the safety conditions of mining dams in the country. This Council was active until August 2020. The Ministry of Mines and Energy – MME, for its part, published Ordinance No. 138/2019, which established the Technical Committee for the Monitoring of Mining Dam Safety – CTBMin.

On the other hand, after the Brumadinho accident, ANM Resolutions No. 4/2019 and No. 13/2019[34] prohibited the construction of upstream dams in Brazil, which are characterised by being quite unstable (especially in seismic areas) and by presenting a higher risk of detachment. These types of dams have been preferred by some mining companies in Brazil, as they represent the lowest construction cost. It is estimated that 84 mining dams were built with the same methods as the one of the Brumadinho case.[35] Given its greater risk, this type of deposit was already prohibited in other countries in the region, such as Chile and Peru[36] (Valenzuela, 2016[7]).

In addition to prohibiting and determining the mischaracterisation of the upstream dams, Resolution No. 13/2019 brought about important obligations linked to the automatic activation of sirens during emergencies and the establishment of automatic real-time monitoring of dams. In addition, Ordinance 70.389/2017 was amended to improve the guidelines of the flood study.

It is worth mentioning that ANM has taken some actions to mitigate this problem by enacting Resolution No. 51/2020 to establish the Conformity and Operational Assessment of The Emergency Action Plans for mining tailings dams. Under this regulation, a mining company now is required to annually execute, for each of its tailing's dams, a comprehensive evaluation to check whether the dams comply with current safety standards to operate.[37]

Recently, the Brazilian government has enacted Law No. 14.066/2020,[38] a bill that amends Law No. 12.334/2010[39] and imposes stringent safety rules and inspection for upstream tailings dams in the mining industry. Article 2-A, § 2 of the law now forbids the construction or raising of upstream tailings dams, which are the ones built by placing successive layers of mineral waste one on top of the other (the same type that caused the Brumadinho disaster in January 2019). Besides, the law determines the

decommissioning of all these structures by 25 February 2022.[40] Mining companies are also responsible for drafting an Emergency Action Plan, which execution is mandatory by those responsible for dams. Likewise, the law establishes that areas degraded by mining accidents or environmental disasters are among those that have priority to receive resources from the National Environment Fund (FNMA). The new legislation also sets fines of up to USD 200 million to mining companies if they fail to comply with the safety rules. It also forbids the construction of potential tailings dams close to communities that are within 10 km downstream or within a 30-minute distance (inside the ZAS or the self-rescue zone).[41] In case of a severe infringement of the law, item VIII of Art. 17o-C establishes that a company can also lose its mining title.

Box 3.6 summarises selected strategies implemented by the Brazilian government to tackle the negative effects of the mining tailings spills.

Box 3.6. The governmental reaction to the Mariana and Brumadinho tailings dams' disasters in Brazil

The disasters in Mariana and Brumadinho increased the dimension of society's negative perception of mining, while alerting Brazilian authorities about the importance of establishing effective policies for the prevention of new occurrences, aware that such tragedies can no longer be tolerated. In this light, the Brazilian government implemented immediate actions, and committed efforts to promote a concrete change in the mining tailings dam's safety scenario, with the strengthening of the regulatory framework and the restructuring of the ANM to ensure that it is effective to enforce mining safety standards.

These changes included the following regulatory improvements:

- Ordinance No. 70.389/2017 that modified the National Registry of Mining Dams, reviewed the classification criteria for tailings dams, and revised the requirements of the emergency action plan.
- ANM Resolutions No. 4/2019 and No. 13/2019 prohibited the building of upstream dams in Brazil, which are characterised by being quite unstable and by presenting a higher risk of detachment.
- Law No. 14.066/2020, a bill that amends Law No. 12.334/2010. The law imposes stringent safety rules and inspection for upstream tailings dams in the mining industry.

In the wake of the disasters, the Public Ministry and the Judiciary acted in the cases of socio-environmental damage resulting from mining activity. As an example, it can be mentioned the agreement to repair damages caused by the Brumadinho tragedy, signed between Vale and the government of Minas Gerais, in the amount of USD 7 billion.[1]

At the time of preparing this report there were several concrete actions in the development phase. An example is the changes to Decree No. 9.406/2018 for promoting the improvement of the sector's business environment in the country and determining that the closure of the mine may include, among other aspects, the monitoring and of the tailings and waste disposal systems and stability of geotechnical areas.

1. See for further details https://www.cnj.jus.br/tribunal-homologa-acordo-de-indenizacao-do-desastre-de-brumadinho-mg/ (accessed 5 January 2021).
Source: Ordinance No. 70.389/2017; ANM Resolutions No. 4/2019 and No. 13/2019; Law No. 14.066/2020.

Despite the improvements in the regulation of the safety of mining dams, Brazil still has some gaps to be filled in the different stages of tailings dam management. In general, the legislation establishes important scopes for the safety of the dams during the operational phase of the mining project, such as that the inspection be carried out during the entire useful life of the project or that there be an emergency action plan (PAEBM).[42] Additionally, in the operation stage, the safety of the dams is supervised by the ANM, which oversees the implementation of the safety plans of the mining dams. This can be done through the information registered in the Integrated System of Mining Dams Management (SIGBM) or through on-site inspections.

However, as discussed in an issue further below, the ANM faces severe restrictions in terms of resources and staff that hinders its ability to carry out enforcement and inspections activities.[43]

Regarding the regulation of tailings deposits in the design stage, Brazilian legislation obliges the mining concessionaire to carry out an environmental impact assessment (EIA) to start its mining activities. However, unlike countries like Chile, it does not establish enough regulations to control the specific risks associated with the management of tailings dams during its construction. When implementing mining projects in Brazil, the mining entrepreneur prepares an Economic Use Plan (PAE)[44] to obtain the mining concession, which must be authorised by ANM and is subject to the approval of the respective environmental licences by the competent environmental agency. However, the environmental evaluation does not consider the specific risks associated with the complexity of constructing and operating tailings dams and ponds during long periods of time until its closure.[45]

Brazil also lacks specific regulations regarding mining tailings in relation to a mine closure plan. In the closure stage, there are no legal provisions regarding the treatment of mining tailings inside a project of mine closure and rehabilitation of impacted areas.[46] In the closure stage, there are only general legal provisions regarding the treatment of mining tailings inside a project of mine closure and rehabilitation of impacted areas.[47] Therefore, the environmental impact assessment, which includes a plan for the rehabilitation of degraded lands, is used in Brazil to manage matters related to the abandonment of tailings ponds and dams. Brazil is taking steps towards more efficient regulations regarding tailings management after the passing of Law No. 14.066/2020.[48]

Gaps in the reforms of mining regulations

Reforms to improve mining regulations centered on controlling critical risks and preventing accidents are still pending. There are uneven efforts to modernise and update the mining regulatory framework with a strong focus on tailings dams' safety in detriment of other areas, such as geomechanical and geotechnical standards, ventilation safety criteria, underground and open pit stability conditions, mine pipelines, etc.

ANM has started a review of certain regulations through its Regulatory Agenda 2020/2021 (Resolution No. 20/2019). However, after the accidents of Mariana (2015) and Brumadinho (2019), reforms of safety regulations in the Brazilian mining industry have focused on increasing the security factor of tailings dams and on specific topics (tailings dam certification, re-use of tailings, fossils exports, economic plans for mineral usage, border strip licensing processes, and management of conflicts in geo-mining territorial ordering). Even though, the constant assessment of technical regulations is necessary to prevent accidents and reactionary policies, there is no plan to review safety regulations and other aspects of the mining regulatory framework such as safety standards and inspection processes.

On the other hand, Brazil does not have an integrated registration system for mining accidents. Instead, ANM obtains information from them through the Occupational Accident Communication Registry, the reports it receives from companies, and the inspections it carries out. However, these different sources of information do not necessarily coincide or are accurate.

In Brazil, since 1970, accidents and occupational diseases in all sectors are registered in the Registry of Work Accidents (CAT) of the Social Security. In addition, ANM can obtain information regarding workplace accidents through the reports it receives from the mining companies, as well as the inspections it carries out. In effect, NRM-01 (Item 1.5.1) and Ordinance 12/2002/DNPM/MME establish the obligation for mining companies to issue annual reports, which must include a record of accidents that have occurred during a year. Likewise, Item 1.6.1 of NRM-01 establishes that mining companies must provide DNMP supervisory officials with reports and records of safety, occupational health, and environmental controls. Besides, NRM-01 requires that workplace accident statistics and reports be kept organised, updated, and available for supervision (Item 1.2.1.18).

Despite the availability of these sources of information, they are dispersed and not consolidated in a unique platform, which makes difficult the management of mining accidents information. On the one hand, there are various studies that point out an underreporting of accidents in the Social Security Work Accident Register (Lopes Correa and Ávila Assunção, 2003[8]) and (Cordeiro et al., 2005[9]). On the other hand, there is a mismatch between the data issued by mining companies and those published by the National Institute of Social Security (INSS).49 Brazil is the fourth country with the highest number of workplace accidents, according to the International Labour Organization (ILO).[50] Furthermore, the average number of mining accidents would be up to four times the national average number of accidents. Under this reality and with the inconveniences of the current sources of information on mining accidents, a change towards a new form of registration is considered necessary.

Measures to fight illegal mining and regulatory enforcement for artisanal small-scale mining regulations

Under current Brazilian legislation, illegal mining extraction is fought by a *carrot and stick* policy. First, ANM performs a *carrot* policy by deploying campaigns to promote mining cooperatives among small miners. These cooperatives can induce the formalisation of small operations by creating a value chain around mineral processing, especially in the case of the extraction of aggregates, clay, gold, and diamonds.

The Brazilian government, through the Federal Police Department, repress illegal artisanal mining activities (*stick* policy) applying prohibition measures such as the arrest of illegal miners and the destruction of mining equipment. See also Box 3.7 for a summary of recent initiatives to fight illegal mining in Brazil.

Box 3.7. Recent initiatives to fight illegal mining in Brazil

SGM Ordinance No. 108 of 11 July 2019 created the SGM and ANM Working Group to give greater support to the legalisation of gold mining activities. Throughout the Group's duration, hearings were held with several companies, associations, and cooperatives, in addition to a technical visit to Santarém, PA and Itaituba, PA, as well as participation in public hearings on the topic, in Santarém, PA and Parauapebas, PA.

The working group stressed that the current legislation authorises public administration bodies – among them ANM and IBAMA – to enter into conduct adjustment agreements that make it possible to take initiatives so that mining in a situation that can be regulated is legalised. From the fulfilment of legal prerequisites – environmental, social, mining, land tenure norms – it is possible to modify this reality and it is from this understanding that the federal government has been working on.

The final report of this working group was completed in November 2019. The main recommendations were:

- Institutionally and administratively strengthen the National Mining Agency, in view of its central role in the governance of the sector;
- Establish an official and mutual institutional commitment (Term of Adjustment of Conduct), which leads miners to safety and supports the conformity of the activity to the standards of social, economic and environmental sustainability, in a broad and constant effort for formalisation;
- Create technical centres and credit lines linked to the formalisation commitment;
- Define strategies to strengthen associativism, bringing technical and administrative information and instruction to the best functioning of each enterprise;
- Intermediate and provide parameters for the relationship between small and large mining, encouraging mutual trust;
- Create a commission or committee that brings together, in addition to mining, the areas of environmental health, science and technology education and work;
- Regulate Law No. 7.805/1989 so that it also includes the repeal of articles 11 and 40 of Decree No. 9.406/2018 and gives security to the sector and the National Mining Agency itself in fulfilling its regulatory role;
- Control and certify the extraction and legal trade of minerals from the mines;
- Regulate Law No. 12.844/2013 regarding the purchase and sale of gold, the recognition, by the Federal Government, that the mining activity goes beyond mining issues and that implementation of isolated public policies will not be able to regularise and promote sustainable development of the activity and enhance its positive participation in society and the economy.

Source: Information provided to OECD by the Secretariat of Geology, Mining and Mineral Transformation of the Ministry of Mines and Energy of Brazil.

Notes

[1] Decree No. 23 979 of 8 March 1934. Available at https://www2.camara.leg.br/legin/fed/decret/1930-1939/decreto-23979-8-marco-1934-499088-publicacaooriginal-1-pe.html (accessed 13 December 2020).

[2] Art.2, Law No. 13 575.

[3] The DNPM was created in 1934 as a division of the Ministry of Agriculture, Trade and Public Policy and then, in 1960, absorbed by the new Ministry of Mines and Energy.

[4] ANM grants mining concessions to extract sand and gravel for construction uses; rocks and other mineral substances, when equipped for cobblestones, guides, gutters, fence posts; clays for various industries; ornamental and cladding rocks; and calcium and magnesium carbonates used in different industries. The Ministry of Mines and Energy grants the concessions for all other mineral substances.

[5] The substances under the granting power of the MME are base metals (e.g., copper, zinc, aluminium), precious metals (e.g., gold, silver), ferrous materials such as iron ore, and gems (e.g., emeralds and diamonds).

[6] The pre-market phase of the mineral water industry in Brazil considers the licensing stage of water extraction, the exploration and exploitation phases of water production, as well as the processing of mineral water.

[7] This norm is available at http://appasp.cnen.gov.br/seguranca/normas/pdf/Nrm401.pdf.

[8] Although the *Companhia de Pesquisa de Recursos Minerais* changed its name to Geological Survey of Brazil (Serviço Geológico do Brasil), in Brazil it is still known for its acronym CPRM. That explains the use of the acronym SGB-CPRM.

[9] The *Pluriannual Plans* (PPA) are instruments provided in the Federal Constitution in which a set of public policies are declared for a period of four years.

[10] Sometimes state mining regulations may be more stringent than the federal regulations as it is the case of the regulations of mining activities in the state of Minas Gerais.

[11] Art. 3, Cap. 1 of The Mining Code. It is important to note that, although the Mining Code is from 1967, it was changed over the years, mainly by Law No. 9.314/1996, by Law No. 13.975/2020 which included new substances in the licensing regime, and recently by Law No. 14.066/2020 which updated and included several articles.

[12] The monopolisation regime in Brazil applies to the production and exploitation of radioactive substances such as uranium.

[13] The *Pluriannual Plans* (PPA) are instruments provided in the Federal Constitution in which a set of public policies are declared for a period of four years.

[14] The definition of areas to be mapped also considers the guidelines of the National Mining Plan 2030 (*Plano Nacional de Mineração* 2030 – PNM), published in 2011 by the Ministry of Mines and Energy. The PNM is a strategic document that guides public policies aimed to the development of Brazil's mining sector considering a period of 20 years.

[15] The thematic databases fed with information obtained in geological mapping projects are: i) projects, ii) outcrops, iii) mineral resources, iv) petrography, v) geochronology, vi) lithostratigraphy, vii) geochemistry, and viii) paleontology. These databases are available to the public for free consultation and download in the Geoscience System of the Geological Survey of Brazil – CPRM (GeoSGB). Available at http://geosgb.cprm.gov.br/ (accessed 29 September 2020). Maps, GIS, databases, and reports are also available at the Institutional Geosciences Repository (RIGEO). Available at http://rigeo.cprm.gov.br/?locale=en (accessed 29 September 2020).

[16] Available at http://www.planalto.gov.br/ccivil_03/leis/L6567.htm (accessed 30 September 2020).

[17] This permit regime will be analyzed in a deeper way in subsection 1.3 of this Chapter.

[18] Exceptionally, during exploration stage, preliminary mining activities can take place under a legal instrument granted by ANM and known as *guia de utilização* (paragraph 2 article 22 of the Mining Code).

[19] According to the Federal Constitution and the Mining Code, the main characteristic of the legal nature of a mining concession is that it is not a traditional concession oriented to provide a public service such as electricity or natural gas. In this case, the Federal Union grants an individual or company the right to economically extract a good that belongs to the Union, that is, it is a concession to exercise of an economic activity to exploit mineral resources.

[20] Paragraph 1, article 176 of the Federal Constitution establishes that Brazilians or companies constituted under Brazilian laws and with headquarters and administration in Brazilian territory may carry out exploration and mining activities.

[21] Brazilian NRMs are available at https://anmlegis.datalegis.inf.br/action/actiondatalegis.php?acao=abrirresenhaano&cod_menu=6677&cod_modulo=351 (accessed 09/09/2020). They were modified and consolidated by DNPM Ordinance No. 237/2001.

[22] This norm is available at http://appasp.cnen.gov.br/seguranca/normas/pdf/Nrm401.pdf (accessed 15 September 2020).

[23] In accordance with article 23o, VI, of the Federal Constitution of 1988, the Union (Federal Government), the States, the Federal District, and the Municipalities are incumbent of protecting the environment and fighting pollution in any of its forms. Thus, in the environmental jurisdiction, in addition to IBAMA, which focus more on matters at the federal level, there are also environmental bodies linked to States and Municipalities, as well as, in some cases, their respective autarchic institutions. It is important to point out that it is not the focus of this Report the analysis of environmental regulatory affairs since the interest is put on ANM's regulatory governance.

[24] The social optimality of enforcing safety and labour standards in the Brazilian mining industry from a theoretical perspective is beyond the scope of this report. For a review of microeconomic models that provide an analytical framework to understand the regulation of safety standards in extractives industries like mining, see (Cohen, 1987[12]) and (Vásquez Cordano, 2012[11]).

[25] For more information about the granting process of ASM mining permits, see https://www.gov.br/pt-br/servicos/requerer-permissao-de-lavra-garimpeira (accessed 9 October 2020).

[26] The term “small-scale mining” denotes a series of small-scale activities such as digging, marking, panning, and shovelling, leading to the extraction of minerals.

[27] In this report, *informal mining* is considered to have the following attributes: 1) it has a reliance on physical labour for all types of operations, making minimal use of technology; 2) it may lack of complete legal mining licences, titles, leases and claims to the mineral areas for exploratory and extractive activities; 3) it exhibits low levels of productivity per mining operation, resulting from relatively small geographical areas; 4) it has low levels of health and environmental safety for miners, workers and local communities; and 5) it exhibits a transient character of employment due to the seasonal dependence of mining. Therefore, informal mining is one that does not comply with some part of mineral legislation and does not recognise workers as employees, not allowing them access to social security and labour benefits, like unemployment insurance, and leading to unacceptable work situations. Informal mining is liable to be formalised if it complies with the requirements of mineral, environmental and occupational health, and safety legislation. This kind of mining remains in the informality with the express intention of staying on the margin of legality and hence avoid the costs and controls imposed by the State (Kuramoto, 2001[10]).

[28] In the Peruvian legislation, the definitions of illegal and informal mining are established in the Legislative Decree No. 1105 (April/19/2012).

[29] Illegal mining occurs when the extractive activity removes mineral goods from areas where mining is prohibited, such as public areas, permanent environmental preservation, and indigenous lands. In this case, mining is considered a federal crime since it is removing ores from areas of the Union.

[30] Available at https://www.in.gov.br/en/web/dou/-/decreto-n-10.239-de-11-de-fevereiro-de-2020-242820142 (accessed 24 February 2021).

[31] It is important to point that DNPM Ordinance No. 70.389/2017 regulates risk classification criteria based on Resolution CNRH No. 143/2012, considering additional specific safety aspects that applies only to tailings dams. See for further details https://www.in.gov.br/materia/-/asset_publisher/Kujrw0TZC2Mb/content/id/20222904/do1-2017-05-19-portaria-n-70-389-de-17-de-maio-de-2017-20222835 (accessed 24 February 2021).

[32] This Ordinance revised the standards already issued for dam safety regulations: DNPM Ordinances No. 416/2012 and No. 526/2013. See for further details: https://www.sionadvogados.com.br/en/dnpm-publishes-new-rule-concerning-dam-safety-regulations/ (accessed 25 February 2020). This norm regulates aspects of the planning and design phases, such as, for example, the elaboration of the dam's flood map of tailings, including the need to identify residences with the number of existing population and identification of social vulnerabilities, such as people with special needs, the elderly, children, among others.

[33] Available at https://app.anm.gov.br/sigbm/publico (accessed 5 May 2021).

[34] Available at https://www.in.gov.br/materia/-/asset_publisher/Kujrw0TZC2Mb/content/id/63799094/do1-2019-02-18-resolucao-n-4-de-15-de-fevereiro-de-2019-63799056 and https://www.in.gov.br/web/dou/-/resolucao-n-13-de-8-de-agosto-de-2019-210037027 (accessed 10 April 2021). The last resolution regulates the de-characterisation activities of dams built or raised by the so-called upstream method or by declared method, establishing a structure de-characterisation schedule to be fulfilled by 2027.

[35] See for further details https://www.metalbulletin.com/Article/3858914/Upstream-tailings-dams-banned-in-Brazil-following-Vale-incident.html (accessed 25 February 2021). See also ANM Resolution No. 004/2019 available at https://www.in.gov.br/materia/-/asset_publisher/Kujrw0TZC2Mb/content/id/63799094/do1-2019-02-18-resolucao-n-4-de-15-de-fevereiro-de-2019-63799056 (accessed 10 April 2021).

[36] Article 77º of Supreme Decree No. 040-2014-EM forbids the construction of tailings dams using the upstream method. Available at https://busquedas.elperuano.pe/normaslegales/reglamento-de-proteccion-y-gestion-ambiental-para-las-activi-ds-n-040-2014-em-1163198-2/ (accessed 10 April 2021).

[37] Available at https://www.in.gov.br/web/dou/-/resolucao-n-51-de-24-de-dezembro-de-2020-296821959 (accessed 22 February 2021).

[38] Available at https://www.in.gov.br/en/web/dou/-/lei-n-14.066-de-30-de-setembro-de-2020-280529982 (accessed 13 December 2020). The law provides the regulation of safety actions to be adopted in the planning, design, construction, first filling and first pouring phases, operation, deactivation, de-characterisation, and future uses of tailings dams.

[39] This legislation establishes the regulation of safety actions to be adopted in the planning, design, construction, first filling and first pouring phases, operation, deactivation, de-characterisation, and future uses of dams.

[40] In relation to the phase of decommissioning and future uses of the structures, the Regulatory Agenda of ANM, established in Resolution No. 20/2019 provides for the regulation of the following activities in the 2020/2021 biennium: i) mine closure, ii) use of waste and tailings, and iii) financial guarantees or insurance to cover risks arising from mining activities. Available at https://www.in.gov.br/en/web/dou/-/resolucao-n-20-de-3-de-dezembro-de-2019-231271506 (accessed 22 February 2021).

[41] The self-rescue zone (or ZAS for its acronym in Portuguese) stretch of the valley downstream of the dam in which there is not enough time for the competent authority to intervene in an emergency, according to the flood map.

[42] Recently, ANM published Resolution No. 51/2020 that deals with the conformity assessment and operation declaration of the PAEBM. Available at https://www.in.gov.br/web/dou/-/resolucao-n-51-de-24-de-dezembro-de-2020-296821959 (accessed 22 February 2021).

[43] Short term measures to tackle the lack of inspections capacity include the publication on 27 January 2021 of a notice of simplified selection process offering 40 vacancies for dam safety technicians, as authorised by Interministerial Ordinance No. 23.478/2020 ME-MME.

[44] The PAE establishes the conditions for the disposal of tailings for the life of the mine, whether in tailings dams or another method defined in the project. To carry out the referred PAE, an environmental impact study and an environmental impact report (EIA/RIMA) are required. Therefore, it is mandatory to present the EIA/RIMA for tailings deposits in the PAE preparation phase.

[45] It is important to highlight the special situation of the State of Minas Gerais, the main mining state in Brazil. This State published Law No. 23.291/2019, on February 22, 2019 establishing the State Dam Safety Law. Article 6º of this Law establishes that the construction, installation, operation, expansion and raising of dams in the State depend on prior environmental licensing. It also forbids the constructions of upstream tailings dams, halts the operation of upstream dams, and mandated the decommissioning of this type of tailings dams. The State of Goiás passed State Law No. 20.758/2020 which regulates specific rules for the environmental licensing of these structures.

[46] A bottleneck for the implementation of regulation on mine closure is the financial guarantee that mining companies need to calculate and set aside to rehabilitate the damaged area. Mining companies might be concerned with the financial implications of these guarantees, but also with the governance of a potential fund.

[47] Although the Mining Code does not regulate the mining closure, there are some articles in Decree No. 9.406/2018 that provide general rules, as well as a draft resolution pending at ANM that aims to regulate the procedure for closing mine, which is currently regulated in the Regulatory Norm of Mining (NRM) No. 20.

[48] It is important to highlight that this law has also amended Article 43-A of the Mining Code establishing that the recovery of the degraded environment foreseen in a mining project should include, among others, the closure of the mine and the decommissioning of all installations, including tailings dams, in accordance with the current legislation.

[49] An example is the case of Vale, an iron producer, which in a 2005 reported the death of 11 workers, while the INSS published that in that year only 3 people died in the iron ore extraction sector. See for further details https://www.brasildefato.com.br/2016/07/08/acidentes-na-mineracao-superam-em-ate-tres-vezes-a-media-nacional-mostra-fundacao (accessed 5 October 2020).

[50] See for further details https://agenciabrasil.ebc.com.br/es/geral/noticia/2016-04/brasil-es-el-cuarto-pais-del-mundo-en-accidentes-de-trabajo (accessed 5 October 2020).

References

Câmara dos Deputados do Brasil (2013), *79 Anos do Departamento Nacional de Produção Mineral*. [1]

Cohen, M. (1987), "Optimal Enforcement Strategy to Prevent Oil Spills: An Application of a Principal-Agent Model with Moral Hazard", *Journal of Law & Economics*, Vol. XXX, https://www.jstor.org/stable/725390?seq=1#metadata_info_tab_contents (accessed on 4 October 2021). [12]

Cordeiro, R. et al. (2005), "Underreporting of non-fatal work-related injuries in Brazil", *Revista de Saude Publica*, Vol. 39/2, pp. 254-260, http://dx.doi.org/10.1590/S0034-89102005000200017. [9]

Globo (2015), "Samarco é notificada por governo de MG a pagar multa de R$ 112 milhões - notícias em Desastre Ambiental em Mariana", http://g1.globo.com/minas-gerais/desastre-ambiental-em-mariana/noticia/2015/11/samarco-e-notificada-por-governo-de-mg-pagar-multa-de-r-112-milhoes.html (accessed on 23 September 2021). [6]

IBAMA (2019), *Ibama multa Vale em R$ 250 milhões por catástrofe em Brumadinho (MG)*, http://www.ibama.gov.br/noticias/730-2019/1879-ibama-multa-vale-em-r-250-milhoes-por-catastrofe-em-brumadinho-mg (accessed on 23 September 2021). [5]

IFC (2007), *Guías sobre medio ambiente, salud y seguridad para fundiciones*, Grupo Banco Mundial. [3]

Kuramoto, J. (2001), *La Minería Artesanal e Informal en el Perú*, International Institute for Environment and Development (IIED), https://pubs.iied.org/sites/default/files/pdfs/migrate/G00731.pdf (accessed on 4 October 2021). [10]

Lopes Correa, P. and A. Ávila Assunção (2003), "A subnotificação de mortes por acidentes de trabalho: estudo de três bancos de dados", *Epidemiologia e Serviços de Saúde*, Vol. 12/4, pp. 203-212, http://dx.doi.org/10.5123/S1679-49742003000400004. [8]

MDNP (2020), *2020 Country Fiches: Brazil. EU-Latin America Mineral Development Network Platform*, https://www.mineralplatform.eu/tools/country-fiches. [4]

Parreiras de Faria, M. and T. Dwyer (2013), *Safety and health in mining in Brazil;*, University of Gothenburg. [2]

Valenzuela, L. (2016), "Design, construction, operation and the effect of fines content and permeability on the seismic performance of tailings sand dams in Chile", *Obras y Proyectos*, pp. 6-22, https://scielo.conicyt.cl/pdf/oyp/n19/art01.pdf. [7]

Vásquez Cordano, A. (2012), *The Regulation of Oil Spills and Mineral Pollution: Policy lessons for the U.S.A. and Peru from the Deep Water Horizon blowout and other accidents*, Lambert Academic Publishing, Berlin, http://dx.doi.org/10.1016/J.RESOURPOL.2010.08.002. [11]

4 Performance of the internal governance of the National Mining Agency

This chapter describes the governance arrangements in the National Mining Agency through the lens of the *OECD Best Practice Principles for Regulatory Policy: The Governance of Regulators*. The section provides a brief definition of each of the seven principles and offers a detailed description of the actions that ANM has taken to comply with each one of them. The chapter also includes a subsection on the steps that the Agency has taken to foster administrative simplification and reduce red tape.

Governance of the mining sector in Brazil

The governance of the mining sector in Brazil has changed significantly in recent years. In 2017, Law No. 13.575/2017 created the National Mining Agency, an autarchic institution with the mandate to regulate mining activities, grant mining titles and perform inspection and enforcement actions. Although the Agency was established legally in 2017, it became operational in December 2018 (Decree No. 9.587/2018). The Agency replaced the former National Department of Mineral Production (DNPM), an administrative division linked to the Ministry of Mines and Energy, which, along with the Ministry of Mines and Energy, had been the governing body of the sector since 1960. The need to modernise and restructure the mining regulator and to revitalise the sector were some of the main drivers for the replacement of the DNPM.

This chapter describes the governance arrangements of the newly created National Mining Agency using as framework the seven principles set by the OECD Best Practice Principles for Regulatory Policy: The Governance of Regulators (see Box 4.1). Furthermore, it describes the efforts that ANM has deployed to reduce the administrative burdens that mining operators face and that hinder the performance of the Agency.

Box 4.1.Seven OECD Best Practice Principles for the Governance of Regulators

1. **Role clarity.** An effective regulator must have clear objectives, with clear and linked functions and the mechanisms to co-ordinate with other relevant bodies to achieve desired regulatory outcomes.
2. **Preventing undue influence and maintaining trust.** Regulatory decisions and functions must be conducted with the upmost integrity to ensure that there is confidence in the regulatory regime. There need to be safeguards to protect regulators from undue influence.
3. **Decision making and governing body structure.** Regulators require governance and decision making mechanisms that ensure their effective functioning, preserve their regulatory integrity and deliver the regulatory objectives of their mandate.
4. **Accountability and transparency.** Business and citizens expect the delivery of regulatory outcomes from government and regulatory agencies, and the proper use of public authority and resources to achieve them. Regulators are generally accountable to three groups of stakeholders: i) ministries and the legislature; ii) regulated entities; and iii) the public.
5. **Engagement.** Good regulators have established mechanisms for engagement with stakeholders as part of achieving their objectives. The knowledge of regulated sectors and the businesses and citizens affected by regulatory schemes assists to regulated effectively.
6. **Funding.** The amount and source of funding for a regulator will determine its organisation and operations. It should not influence the regulatory decisions and the regulator should be enabled to be impartial and efficient to carry out its work.
7. **Performance assessment.** It is important that regulators are aware of the impacts of their regulatory actions and decisions. This helps drive improvements and enhance systems and processes internally. It also demonstrates the effectiveness of the regulator to whom it is accountable and helps build confidence in the regulatory system.

Source: OECD (2014[1]), *The Governance of Regulators*, OECD, Paris, France, https://doi.org/10.1787/23116013.

Role clarity

The role clarity principle refers to one of the main characteristics that independent regulators should have in order to achieve their objectives effectively. It implies that the regulator's goals and attributions are defined clearly, are not conflicting among them, and are stated formally in the legislation. The agency's scope of action and area of influence, especially in newly created regulators, should be understandable for other public institutions, regulated parties, and the public. The latter helps stakeholders keep the regulator accountable for its actions and prevents other entities from overstepping in their relation with the regulator.

It is important that regulatory agencies have adequate resourcing to discharge its responsibilities effectively. If the regulator is forced to prioritise specific objectives because it does not have enough resources to comply with all of them, these trade-offs should be disclosed to stakeholders. In these cases, activities related to regulatory compliance shall remain high in the list of priorities of the regulator and try to allocate staff and funding to them (OECD, 2014[2]).

Moreover, the regulatory framework that underpins the operations and responsibilities of the regulator should define co-ordination mechanisms between the regulatory agency and other bodies. Co-operation with other entities of the public administration helps identify and address regulatory gaps and overlaps, and fosters better public policy outcomes. Collaboration across institutions allows for the streamline of processes, reduces administrative burdens and promotes a more efficient use of the regulator's resources.

This subsection will tackle the role clarity principle in the National Mining Agency from two angles: its objectives and functions and the co-ordination mechanisms in place.

Objectives and functions

In 2017, the National Mining Agency replaced the former National Department of Mineral Production, having as one of its objectives promoting access and rational use of the mineral resources of the Union in a socially, environmentally and economically sustainable way. ANM is an autarchic institution[1] linked to the Ministry of Mines and Energy, it has legal personality, owns assets and is entitled to receive revenues to carry out activities of the public administration that require, for its better functioning, a decentralised financial and administrative management. The law of creation of ANM (Law No. 13.575/2017) and the Law of Regulatory Agencies (Law No. 13.848/2019) lay the attributions and means by which the Agency should fulfil its objectives. ANM's responsibilities include those under the former DNPM's remit as well as attributions inherent to regulatory agencies. Furthermore, the Mining Code (1967) and its bylaw (Decree No. 9.406/2018) underpin ANM's scope of action concerning mineral substances. ANM is the entity responsible for the implementation of the mineral policy in the country and its functions can be grouped under six headings.

1. **Regulatory attributions:** The Agency defines regulations, standards and conditions for the use of mineral resources, the performance of inspection and enforcement activities. Moreover, it decides on mineral rights and on the delimitation of areas for public utility.
2. **Management attributions:** ANM manages the mineral record and registration of title deeds and mining rights and regulates the information exchange on mining operations among the authorities and entities of the Union, the States, the Federal District, and Municipalities.
3. **Financial attributions:** ANM regulates, inspects and collects two kinds of royalties, the Financial Compensation for the Exploration of Mineral Resources and the Annual Tax per Hectare.
4. **Emission of grants, titles and certificates:** ANM concedes exploration permits for all mineral substances and grants mining concessions for a specific group of minerals (for a detailed list, see Table 4.1). Additionally, the Agency grants the Kimberley Process Certificate for diamond exploration.

5. **Supervision attributions:** The agency is responsible for the inspection of all mining operations and for the adoption of precautionary measures in case of non-compliance of safety, technical and financial regulations.
6. **Promotion and support:** ANM is responsible for fostering economic competition among agents in the mining sector and provide technical support to the MME in matters of mineral policy and to the Economic Defence Management Board (CADE) in matters of antitrust policy.

Table 4.1. Minerals under ANM's remit for mining concessions

Mineral substances
Gravel, sand and clay for immediate use in civil construction, in the preparation of aggregates and mortars, provided that they are not subjected to an industrial refining process, nor are they used as raw materials for the transformation industry
Rocks and other mineral substances, when equipped for cobblestones, guides, gutters, fence posts
Clays for various industries
Ornamental and cladding rocks
Calcium and magnesium carbonates used in various industries

Note: The MME grants mining concessions for all other mineral substances, which include iron ore, gold, aluminium (Bauxite), among others.
Source: Law No. 6.567/1978 and Law No. 13.575/2017.

The creation of a regulatory agency for the mining sector in Brazil is a step that has been welcomed by a wide range of stakeholders in the country. However, some key actors are still in the process of embracing completely the role of ANM and the changes brought with it. The foundation of ANM means that a new working and regulatory culture is being developed, and as such, interactions between key actors are expected to evolve.

In particular, the review team identified that some administrative areas inside ANM and other public entities have yet to modified its working practices to reflect the new governance arrangements, where the Board of Directors of the Agency is the main decision-making body in terms of regulation for the mining industry. It is important that ANM's regional units, the Ministry of Mines and Energy, and other key actors in the sector, understand and respect the role, independence, and governance framework that underpin the operation of ANM.

Furthermore, another factor that hinders the Agency's ability to discharge its functions effectively is the lack of adequate resourcing, particularly in terms of staff. Although the Agency is working with the Dom Cabral Foundation to assess its organisational structure and identify areas for improvement, and upgrade its leadership; since its creation ANM has been forced to make trade-offs between its functions. The following sub-section will describe the Agency's organisational structure, its main characteristics and opportunity areas.

ANM's organisational structure

An adequate human resources structure is a necessary condition to ensure that regulatory agencies can discharge their responsibilities efficiently and effectively. ANM inherited the former DNPM's organisational structure. Already in 2016, the National Department had workforce constraints, with only 76% of the positions covered and the last civil servant exam taking place in 2010 (Tribunal de Contas da União, 2019[3]).

The complex baseline situation was further reinforced by the budgetary restrictions in place at the time of creation of the ANM. A ceiling on new hires and the impossibility to equate the monetary compensation for officials working in the ANM with that of other regulatory agencies in the country have further limited the room for manoeuvre of the Agency in terms of its staff. In addition, there are concerns in place regarding the large share of the Agency's workforce that is close to retirement (38% of staff) and the lack of exams

to join the Agency as a civil servant. The last exam took place in 2010 and, given the current economic situation, the Federal government has restricted the number of new exams. These situations have increased the risk that the Agency will not be able to fill the existing and potential vacancies.

Staff under-resourcing is a problem salient in most administrative areas of the Agency; however, it is especially acute in matters related to economic competition and antitrust. While ANM is responsible for fostering economic competition in the mining sector in Brazil, it has not been able to perform its duties regarding this topic as it lacks the staff with the relevant expertise. Another particularly sensitive topic is the Agency's capacity to fulfil its inspection and enforcement activities successfully. After the accidents of Mariana (2015) and Brumadinho (2019), reports from the National Court of Accounts highlighted the need to strengthen the number of inspectors of tailings dams (see Box 4.2 for a detailed list of the recommendations by the National Court of Accounts) (Tribunal de Contas da União, 2016[4]), (Tribunal de Contas da União, 2019[5]). Initial efforts have taken place and the Agency has opened 40 temporarily vacancies for tailings dams' inspectors (a significant increase from the original 16 officials). Increasing the number of inspectors is a step in the right direction.

Box 4.2. Recommendations from the National Court of Accounts to the National Mining Agency

The TCU recommends ANM to:

- Evaluate its internal processes to identify opportunity areas for the streamlining and optimisation of procedures using ICT tools in order to allocate human capital more efficiently.
- Identify and classify the existing risks. Optimise the allocation of human resources by prioritising the inspection and enforcement resources on the most relevant risks.
- If after adopting the previous measures, there is still a need to adapt the Agency's human resources, submit to the Ministry of Economy a reasoned study on the need personnel, which the Court has repeatedly recommended since 2011.

Source: Tribunal de Contas da União (2020[6]), Relatório de Acompanhamento: Estruturação da Agência Nacional de Mineração.

One way to tackle the resourcing issues is the mobility of staff across public institutions and across administrative units of ANM. In this regard, the Ministry of Economy published the Ordinance No. 282/2020 that encourages staff mobilisation from regulatory agencies and public institutions to improve the allocation of the workforce. In this framework, ANM has benefited from 16 additional civil servants through the movement of staff from other institutions. Additionally, the National Mining Agency is in the process of pooling its staff in the regional offices such that workers are allocated where they are needed the most. This project is still in its pilot stage and it aims at harnessing the use of ICT tools and the new management structure derived from the transition from the former DNPM to the ANM in order to encourage the creation of a national-wide team of officials.

The creation of a new agency is necessarily accompanied by a transition and adjustment period, particularly in the case of ANM, where the previous governance arrangements had been in place for over 40 years. ANM is moving towards a regulatory agency that makes decisions based on evidence and, while there has been resistance by some areas, this change is welcome and encouraged by a wide range of stakeholders. To foster this new culture in the mining regulator, it is important to engage with the staff to intensify the communication of the new working culture of ANM, foster feedback loops and collaboration across different areas of the Agency.

Additionally, it will be necessary to make certain that ANM has the adequate number of staff with the appropriate expertise and competences to fulfil all of the Agency's obligations. The latter requires that ANM's leaders have a "broader range of tools, such as mentoring, coaching, networking, peer learning, and mobility assignments to promote learning as a day-to-day activity integrated into the jobs of civil servants" (OECD, 2017[7]) (see Box 4.3 for a list of principles that the OECD promotes for a fit-for-purpose public service). The National School of Public Administration (*Escola Nacional de Administração Pública, ENAP*) can be an important ally for the ANM. ENAP not only has the infrastructure in place to offer trainings and courses, but also has a leadership competency model that builds on international practices and is transversal to the public sector (OECD, 2019[8]). Even if the ENAP does not have in place specific trainings on mining activities, it is possible to create tailor-made programmes, which ANM could harness to increase the skillset of the officials in the Agency. In fact, in 2019 the National School offered a training course on Dams Safety, with a specific section on mining dams. Moreover, ICT tools offer the possibility to disseminate training opportunities and to increase their reach to regional offices.

Box 4.3. OECD Recommendation on Public Service Leadership and Capability

Values-driven culture and leadership

- Define the values of the public service and promote values-based decision-making
- Build leadership capability in the public service
- Ensure an inclusive and safe public service that reflects the diversity of society
- Build a proactive and innovative public service that takes a long-term perspective in the design and implementation of policy and services

Skilled and effective public servants

- Continuously identify skills and competences needed to transform political vision into services which deliver value to society
- Attract and retain employees with the skills and competences required from the labour market
- Recruit, select and promote candidates through transparent, open and merit-based processes, to guarantee fair and equal treatment
- Develop the necessary skills and competences by creating a learning culture and environment in the public service
- Assess, reward and recognise performance, talent and initiative

Responsive and adaptive public employment systems

- Clarify institutional responsibilities for people management
- Develop a long-term, strategic and systematic approach to people management based on evidence and inclusive planning
- Set the necessary conditions for internal and external workforce mobility and adaptability to match skills with demand
- Determine and offer transparent employment terms and conditions that appropriately match the functions of the position
- Ensure that employees have opportunities to contribute to the improvement of public service delivery and are engaged as partners in public service management issues.

Source: OECD (2019[9]), Recommendation of the Council on Public Service Leadership and Capability, https://www.oecd.org/gov/pem/recommendation-on-public-service-leadership-and-capability-en.pdf.

Additional to the staff and central structure of the Agency in Brasilia, the organisational structure of ANM encompasses 25 regional offices, which are in charge of inspection and enforcement activities in the territory under their supervision. These units are fundamental to navigate the challenges that factors such as the Agency's broad range of attributions, the characteristics of the sector and the territorial extension of the country pose for the implementation of the mineral policy in Brazil.

Although these units have been under the central management hierarchy since the time of the DNPM, they had a de facto autonomy (Tribunal de Contas da União, 2019[3]). The latter led not only to heterogeneity in the interpretation and application of the regulation by each regional unit, but also to a politicisation of the positions, undermining the credibility and transparency of the Agency. For an adequate performance of the Agency, it is necessary that all the staff clearly understands the objective of the institution and their role in attaining it.

Relationship with the Ministry of Mines and Energy

ANM co-ordinates with its parent ministry, the Ministry of Mines and Energy, for the granting of concession titles of certain mineral substances and participates on the elaboration of policy initiatives such as the Mining and Development Programme (*Programa de Mineração e Desenvolvimento*). Additionally, the MME offers guidance and oversees ANM's performance.

The mineral sector would benefit from additional efforts to have more streamlined and integrated processes for titles granting. Given the allocation of responsibilities between the MME and the ANM, the concession of exploitation rights can take up to 30 days once the request reaches the MME, which evaluates the *dossier* prepared by the Agency. Before the creation of the ANM, the MME was in charge of approving exploitation concessions for all mineral substances. Currently, the National Mining Agency is responsible for the assessment and granting of mineral exploration permits for all mineral substances and for the approval of the exploitation concession for a specific subset of substances (see Table 4.1 for a complete list). In the case of all other minerals, it is the Ministry of Mines and Energy the institution that grants the exploitation permits.

Additionally, ANM has participated in the design of key policy documents for the mining sector in Brazil. In 2020, the MME presented the Mining Development Programme 2020-2023, which aims at enhancing growth in the sector by defining ten pillars with over 110 goals to be achieved. Some of these goals relate directly to the structure, operation and management of ANM.

Co-ordination mechanisms

This subsection will assess ANM's co-ordination mechanisms from two lenses: co-ordination with other agencies and institutions and co-ordination across levels of government. In Brazil, the design and implementation of regulations that relate to the mining sector have federal and sub-national components. Mineral, environmental, safety and labour regulations are managed by different institutions, and, in several cases, there are overlaps of attributions. Co-ordination across institutions and government levels is key to ensure that safety, environmental and health risks are managed efficiently. There are opportunity areas to improve the collaboration among entities and thus, unlock benefits from better co-ordination, collaboration and data exchange.

Information and high-quality data are important elements to facilitate collaboration across government institutions. Brazil has defined a Digital Government Strategy 2020-2022 (*Estratégia de Governo Digital*), which aims at ramping up the use of information and ICT tools to have an integrated government where agencies share and use data to inform decisions and to simplify the interactions with stakeholders. This adds to the efforts that the Brazilian government has taken to foster the development, standardisation, and integration of information across the Federal administration since 2011 (Decree No. 7.579/2011). At the moment of preparation of this Review, ANM made available several data sets on the Brazilian Open Data Portal (dados.gov.br), in particular; the Annual Hectare Tax (TAH) and the Financial Compensation for Mineral Exploration (CFEM), the Process Control (SICOP) and the Brazilian Mineral Yearbook.

Co-ordination with other institutions

Regulatory Agencies in Brazil have taken steps towards better collaboration. The Law of Regulatory Agencies (Law No. 13.848/2019) dictates the conditions for the articulation amongst agencies in the country, fostering the elaboration of joint regulations and the development of committees to exchange experiences and information with the objective of creating guidance and common procedures (art. 30). One example of the latter is the Network for the Articulation of Regulatory Agencies (*Rede de Articulação das Agências Reguladoras,* RADAR), which provides a space for sharing information, knowledge and experiences. RADAR is composed by the 11 autarchic regulatory agencies in Brazil.

Nevertheless, ANM would benefit from improving its co-ordination mechanisms with other agencies and entities that also regulate the mineral sector from an environmental, public health or labour safety perspective (e.g. IBAMA, Special Secretariat for Social Security and Labour, ANVISA, state environmental agencies, amongst others). The Law of Regulatory Agencies explicitly encourages the collaboration between environmental protection institutions and regulatory agencies; however, co-ordination actions between ANM and IBAMA are still at an early stage and are not systematic. These efforts have focused on the reduction of administrative burdens for regulated parties. Given the broad number of agencies that have attributions related to mining activities and the relevance of the topics that they cover (e.g. national defence, environment, indigenous rights, and territorial aspects among others), co-ordination is key to ensure a smooth delivery of the regulation. In particular, several stakeholders identified the licensing process to start a mining operation as burdensome. Joint efforts to improve regulatory delivery are necessary to ensure better levels of compliance while keeping red tape at bay (see Box 4.4 on the co-ordination between regulators in Australia).

Regarding the availability and exchange of geological data in the country, ANM, the MME and the Brazilian Geological Survey have signed a Technical Cooperation Agreement to build an integrated geological database. The objective is to aggregate in a single place geoscientific information, data collected from mining operations and from the activities carried out by CRPM. While this initiative is at an early stage, it is a first step to tackle the restrictions to information exchange (e.g. legal and confidentiality limitations) that are in place and that hinder the use of evidence for the development of the mining sector.

Box 4.4. Co-ordination arrangements in the Australian mining sector

Mining and environmental regulation in South Australia

The Mineral Resources Division and the Environment Protection Authority (EPA) of South Australia have signed a Memorandum of Understanding (MoU) in order to "achieve consistent, collaborative and efficient environmental regulation of South Australia's mineral resources, especially when the obligations and responsibilities of the parties overlap".

The MoU defines the responsibilities, actions and co-ordination mechanisms between both agencies regarding licensing, inspection and enforcement activities, incident reporting, and communication and response actions to environmental incidents. Additionally, it states that both parties should be engaged in each other's development of policies and regulations to ensure a better application and implementation.

Source: Department of Energy and Mining (2013[10]), *Administrative Arrangements*, https://www.energymining.sa.gov.au/minerals/mining/mining_regulation_in_south_australia/administrative_arrangements (accessed 27 May 2021).

Co-ordination across levels of government

Co-ordination across levels of government is an area of great complexity given the federal nature of Brazil. Realities in each state differ greatly, which makes it harder for some sub-national governments to keep abreast of all the regulatory reforms and requirements dictated at the national level. Moreover, state and municipal regulations are not homogeneous, increasing administrative burdens for mining operators working in different jurisdictions. In particular, state environmental regulators play a key role for the mineral sector in Brazil, as they perform enforcement activities, which can overlap with those carried out by IBAMA or other federal authorities, including those of ANM. This means that regulators and regulated parties devote a significant amount of resources to implement and comply with the legislation. In fact, it can take businesses up to 10 years to fulfil all the requirements imposed by the Brazilian public administration to open a mining operation.

As part of the efforts to improve the co-ordination across levels of government, the National Mining Agency published Resolution 71/2021 to sign technical co-operation agreements between the Agency and sub-national administrations. These agreements will focus on the inspection of mining activities and the collection of the CFEM. Sub-national administrations that would like to engage in this kind of co-operation must comply with certain conditions, mainly referring to the availability of technical teams and would have to work hand-in-hand with the administrative units of the Agency.

ANM and a wide range of stakeholders are aware of the positive impact that it would have in the industry and in the work stream of state and municipal authorities if mineral procedures would be seen as a single process in which several institutions co-ordinate and collaborate, and as such it should be streamlined and standardised as much as possible.

Preventing undue influence and maintaining trust

The appropriate governance arrangement for a regulator depends on many factors, including on the regulated sector, the characteristics of the players in the market (particularly if state-owned enterprises and private parties are involved), and on the interest groups and impacts of its regulatory decisions (OECD, 2012[11]). Regardless of the institutional setup, upholding public confidence and generating impartial, justifiable regulatory decisions are key to independent regulators. These characteristics mitigate risks (or perceived risks) regarding the regulator's operation and integrity and foster a better perception by the regulated parties, the ministry and the public (OECD, 2014[2]). A high degree of independence should be accompanied by transparency and accountability mechanisms that prevent the undue influence of specific interest groups and ensure the implementation of evidence-based regulatory decisions.

The Law of creation of ANM defines the National Mining Agency as an independent regulator, linked to the Ministry of Mines and Energy. As such, its regulatory decisions, operation and management of resources are shielded from the influence of the parent ministry. The change in the location of the mining regulatory body in Brazil, from a government office linked the Ministry of Mines and Energy to a regulator at arm's length responds to a need to have a regulator that is objective of ensuring regulatory certainty and foster trust and the attractiveness of the mining industry. ANM has taken steps that aim at improving the actual and perceived transparency of the Agency and that prevent undue influence in the rule-making process.

Use of evidence for decision-making

ANM's working culture is moving towards one where decision-making is based on evidence. The Agency has taken steps to implement regulatory impact analysis (*Análise de Impacto Regulatório,* RIA) to inform its regulatory decisions and has open the rule-making process to stakeholders. Moreover, the Agency has produced documents and has participated in capacity-building activities to encourage the uptake and systemic used of RIA as a tool to assess the potential impacts of regulations. For instance, the Guidelines

for the Elaboration of Regulatory Impact Analysis (*Análise de Impacto Regulatório, Manual de Elaboração*) define the criteria and methodologies for the two types of RIA institutionalised at ANM. The two approaches differ on the level of depth of the assessment and are proportional to the significance of the regulation. At the time of preparation of this report, ANM had published four RIAs for public comments (see Table 4.2). The RIAs that the technical areas of ANM prepare are subject to comments from stakeholders, both inside and outside the Agency. Additionally, the Agency is closing the feedback loop for the elaboration and modification of regulations by establishing an *ex post* evaluation five years after a regulatory disposition is enacted.

Table 4.2. RIAs elaborated by ANM

Topic	Stakeholder engagement activities	Public consultation period
Waste rock and tailings exploitation	Public consultation	45 days
Certification of the Emergency Action Plan for Mining Dams	Public consultation	45 days
Public declarations	Targeted consultation	
Brazilian System of Mineral Resources and Reserves	Public consultation	30 days
Compliance in telemetry systems to monitor mineral water mining	Public consultation	45 days

Note: The table refers to the RIAs elaborated by Jun, 2021.
Source: ANM (2021[12]), *Regulação*, https://www.gov.br/anm/pt-br/assuntos/regulacao (accessed 21 June 2021).

As mentioned above, the National Mining Agency has in place two kinds of regulatory impact assessment based on the scope and expected impacts of the regulatory proposal. The Level II RIA incorporates all the elements considered in the Level I RIA, as well as a more detailed assessment of the impacts of the proposed regulation and additional elements to substantiate the final regulatory decision. Below are specified the contents of both types of RIA.

- Level I RIA:
  - Identification of the public policy problem
  - Identification of the affected groups and stakeholders
  - Identification of the legal framework that grants the Agency the attributions to introduce or modify the regulatory disposition
  - Definition of the public policy objectives
  - Definition of regulatory and non-regulatory alternatives
  - Impact assessment
  - Implementation strategies, including monitoring and inspection activities
  - An analysis of the contributions received through stakeholder engagement activities
- Level II RIA:
  - All the elements considered in Level I RIA
  - Impact assessment (in the case of significant regulations, this section should include a quantitative assessment of the impacts – methodologies such as cost-benefit analysis, multi-criteria analysis, cost analysis or cost-effectiveness analysis are encouraged)
  - International experiences in the subject
  - Assessment of the potential impacts of the alternatives identified on the service consumers or users and on the most affected groups
  - Risk-analysis

The legal framework that underpins the Agency's operation supports the use of evidence for decision-making. The Law of Regulatory Agencies (Law Nº 13.848/2019), the Law of Creation of ANM (Law No. 13.575/2017), and the Law of Economic Freedom (Law No. 13.874/2019) and its Decree (Decree No. 10.411/2020) lay the obligation to perform regulatory impact analysis for the modification and emission of regulatory dispositions. Information availability is key to increase the adoption of informed decisions and to ensure the elaboration of high-quality RIAs. At the moment of elaboration of this report, ANM had over ten different information systems that hindered the exchange of information and cross-checking of data.

Maintaining trust in the Agency's senior management

The rules for the appointment of the Board of Directors of the Agency are explicitly stated in the regulatory framework that supports ANM's operation. Although the President nominates the Directors of ANM, the terms of appointment of the members of the Board are not linked to the electoral cycle. The latter shields the Agency from the political context in the country and fosters independence. Besides, the Directors' terms are staggered to avoid losing expertise and ensure a smooth transition between boards.

Additionally, ANM has already in place mandatory cooling-off periods and restrictions to avoid conflicts of interest, which strengthen the level of trust that stakeholders have on the Agency and on the Board members. Directors are prevented from engaging on businesses or offering services within the mining sector and should wait at least for six months after the termination of their activities in ANM to take up a position in a regulated enterprise.

Decision making and governing body structure for independent regulators

The composition, attributions and accountability arrangements that underpin the governing body in a regulatory agency have a significant influence in the regulator's ability to discharge its responsibilities effectively and independently. ANM's decision-making body follows a governance board model, which is in charge of administrative and operational activities, approval of regulatory matters and strategic planning, among others. While this structure grants lower possibility of capture and benefits from a wider range of perspectives and experiences, it is important to ensure *de jure* and *de facto* independence and integrity (OECD, 2014[2]). This section will focus on the regulatory framework that governs the Collegiate Board of ANM and the actions that the Board has taken to foster transparency.

Appointment, employment conditions and termination of board members

The process and regulations that support the appointment, employment conditions and termination of board members and senior management should protect the regulator's independence and restrict the actual or perceived risks of regulatory capture.

ANM's Collegiate Board comprises a Director General and four Directors. The Director General represents the presidency of the Agency and has the casting vote over the board's decisions, which must be approved via absolute majority. The Law of Regulatory Agencies (2019) dictates the general characteristics of the managing bodies of regulatory agencies, including that of ANM. The President of the Republic appoints the members of the Board, which the Senate ratifies. Mandates are non-coincidental, for five-year periods and with no possibility of renewal. When ANM was established, its Law of Creation assigned the following serving terms to its first Board: the Director General (4 years), two Directors (3 years) and two Directors (2 years). The directors that will replace the first Board will be subject to the scheme set up by the Law of Regulatory Agencies.

The legislation states the criteria to appoint members of the Collegiate Board; however, they are general to all regulatory agencies covered by Law 13.848/2019. Additional to having the academic attestations for the position, Directors of the Board must comply with at least one of the following conditions (Art. 42, Law 13.848/2019):

- Have at least ten years of experience in the public or private sector in an activity related to that of the regulatory agency or a similar activity or have at least four years in one of the following positions:
  - Director or higher management in a company in the sector regulated by the agency
  - Management position (director, manager or adviser) or an equivalent to DAS-4[2] in the public sector
  - Professor or researcher in the sector regulated by the agency.

ANM has in place arrangements to avoid conflicts of interest and foster integrity among the members of its Collegiate Board. Conflicts of interest are managed through specific provisions in the law of creation of the National Mining Agency (Law No. 13.575, art. 9 and art. 10). These regulations restrict the possibility of appointment as member of the Collegiate Board to candidates linked to political positions and of people engaged and/or linked to entities regulated by ANM. Additionally, members of the Board have explicit prohibitions in regarding their political, professional, and financial activities and their interactions with regulated parties.

Accountability and transparency

Independent regulatory agencies are expected to be accountable to three groups of stakeholders: ministry and legislature, regulated entities, and the public (OECD, 2014[2]). Fostering a culture of transparency is key to enhance trust and confidence by stakeholders and to delimitate their expectations regarding the regulator's performance. Regulatory agencies with greater independence from the ministry should ensure higher transparency and accountability standards to reduce actual or perceived risks of misconducts (Durand and Pietikäinen, 2020[13]). Moreover, actions such as making publicly available information on the decision-making process, operation and measures taken to promote compliance and enforcement of regulations, are steps in the right direction to boost transparency and to encourage relevant parties to scrutinise the performance of the regulatory agency.

To foster the regulator's accountability to the ministry and legislature it is important that all parts have a clear definition of the goals and objectives for the regulated sector. In this sense, a parallel process where the government defines and makes explicit its expectations of the regulator and the regulator explains how it will fulfil them on its strategic planning can strengthen the accountability arrangements in place. To complement this process, independent regulators should report periodically (usually, this is done annually) to the legislature and ministry on the status of its activities and outcomes based on the sector's policy.

Transparency in decision-making is key to convey trust in the regulatory process. This includes the publication of data and evidence used, as well as the rationale behind a specific decision. In this sense, engaging the public and regulated entities throughout the regulatory cycle makes the acceptance of regulatory and enforcement measures smoother. Furthermore, enabling formal complaint channels and appeals mechanisms that are easily accessible to the general public and regulated entities are necessary to prevent the regulator from overstepping its attributions and to challenge its actions.

The Law of Regulatory Agencies (Law No. 13.848/2019), which requires the Agency to prepare an annual report to the Congress and to the National Court of Accounts (Tribunal de Contas da União, TCU) and to have an ombudsman underpins specific accountability arrangements in ANM. The annual report compares the Agency's compliance with the mineral policies dictated by the Ministry of Mines and Energy and assesses the level of compliance of the Agency's Strategic Plan and the Annual Management Plan. On

the other hand, the office of the ombudsman elaborates a monthly report (and an annual one as well), where it details the characteristics and statistics of the complaints, requests for information, and feedback, among others, that stakeholders present to the Agency. The report also mentions the actions taken to address the complaints.

ANM is fostering regulatory certainty and transparency by publishing a regulatory agenda with the list of regulations to be drafted or modified during the next biennium. The agenda for the period 2020/2021 is the result of an extensive consultation exercise that gathered inputs from ANM's administrative areas and regional offices, from public sector stakeholders and from regulated parties. The topics are prioritised using a Matrix GUT (Gravity-Urgency-Tendency), and are approved by the Collegiate Board (see Table 4.3 for a complete list of the topics and subtopics covered in the Regulatory Agenda 2020/2021). Furthermore, the guidelines available describe all the steps for the elaboration of the regulatory agenda, as well as the responsibilities of each administrative area involved in the process. The Superintendence of Regulation and Regulatory Governance oversees compliance with the objectives of the regulatory agenda and monitors three indicators: compliance of the regulatory agenda, elaboration of RIAs, and regulatory predictability (ANM, 2020[14]).

Table 4.3. Main topics and subtopics of the regulatory agenda 2020/2021

Main topic	Subtopic
Transversal or cross-cut	Conflicts due to mining activities
	Availability of areas
	Mining titles as colateral for financing
	Alternative means to solve conflicts
Sustainability	Mine closure
	Financial guarantees or insurance to cover the risks arising from mining activities
	Waste reuse
Research	Standardization and evaluation of aerophotogrammetry products
	Brazilian System of Certifications of Resources and Reserves
Production	Certification of Dams
	Kimberley Certification
	Withdraw of the requirement/waiver of mining titles
Inspections and CFEM	Inclusion of new substances in the reference value system
	Auxiliary Electronic Note for mineral goods – artisanal mining*
	Bylaw of Law No. 13.540/2017**
	National cadastre for first acquirement of mineral goods from artisanal mining
Mineral Water	Actualisation of the Ordinance No. 374/2009*** and Technical Bylaw-Mineral Water
	Compliance in telemetry systems to monitor mineral water mining

* Refers to *permissão lavra garimpeira;* ** Law No. 13.540/2017: Amends Laws No. 7 990, of 28 December 1989, and 8 001, of 13 March 1990, to provide for Financial Compensation for the Exploration of Mineral Resources (CFEM); ***Ordinance No. 374/2009: Technical Norm on the Technical Specifications for the Use of mineral, thermal, gas, table water.
Source: Resolution No. 20, 3 December 2019 and Resolution No. 45, 3 September 2020.

The regulatory agenda feeds into ANM's culture of using evidence for decision-making, which also includes the introduction of a RIA system for the elaboration of regulatory proposals or the modification of existing rules. The Collegiate Board uses the results from the RIA to inform its decisions, and while the outcomes from the assessment are not binding, the Board is required to justify regulatory decisions that contradict the RIA. The fact that the highest decision-making body in the Agency has endorsed the use of data and a robust methodology to inform its decisions is in line with the OECD Best Practice Principles on Regulatory Impact Assessment (see Box 4.5 for a complete list of the principles).

Box 4.5. OECD Best Practice Principles on Regulatory Impact Assessment

1. **Commitment and buy-in for RIA:** Political commitment as well as the existence of frameworks that foster the integration and implementation of RIA are key to ensure its adoption by stakeholders.
2. **Governance of RIA – having the right set up or system design:** RIA should be part of the regulatory governance cycle and take into consideration the administrative conditions and culture of the country or organisation. The governance of RIA should be accompanied by a clear definition of the attributions and responsibilities of each party and the establishment of an oversight body with an adequate mandate and resources.
3. **Embedding RIA through strengthening capacity and accountability of the administration:** Civil servants responsible for the elaboration of RIAs should have access to adequate guidelines, training and capacity building activities. Moreover, the implementation of accountability and performance-oriented arrangements help define specific actors responsible as well as evaluation schemes.
4. **Targeted and appropriate RIA methodology:** RIA should not be seen as an additional bureaucratic task by civil servants. As such, it should be flexible while keeping in place core elements such as the definition of the public policy, objectives and regulatory (and non-regulatory) alternatives.
5. **Continuous monitoring, evaluation and improvement of RIA:** It is important that data requirements are defined early in the regulatory design stage, this will allow for the definition of monitoring and evaluation regulations. The results from *ex post* evaluations of regulations are useful inputs that can inform future *ex ante* RIAs.

Source: OECD (2020[15]), OECD Best Practice Principles for Regulatory Policy: Regulatory Impact Assessment, OECD Publishing, Paris.

Among the actions implemented by ANM to increase transparency, the Collegiate Board is currently live streaming its meetings. The sessions are open to the public through the Agency's YouTube channel, where stakeholders can participate and see the deliberation process. Streamed meetings take place once a week; however, the Board can meet by request and these reunions are not publicly available. During meetings with stakeholders of the mining sector, they highlighted the positive changes brought by the increase in transparency in decision-making.

Finally, ANM gathers, consolidates and publishes industry-related data. The Agency makes publicly available statistics on investments, mineral production, reserves modification, royalty collection (e.g. CFEM and TAH) by month, mineral and process. Additionally, ANM's portal allows stakeholders to consult information on dams, their risk category, volume, class, among others. Although figures on both topics are easily accessible through ANM's web portal, they are not available in user-friendly formats, making its management and processing by third parties difficult and burdensome. The National Mining Yearbook (*Anuário Mineral Brasileiro*) is another source of information on the mining industry. It gathers statistics on mineral reserves, production, mining operations, royalty collection, mining titles and international trade, mainly focusing on the most relevant metallic substances (from the lens of value production) (ANM, 2020[16]). At the moment of elaboration of this report, ANM was working to improve the disclosure of information using Business Intelligence initiatives.

Engagement

Engagement with all relevant stakeholders is key to ensure that regulatory agencies fully understand the realities of the groups affected or benefited by their policies. By consulting with regulated parties and members of the public, regulators are able to gather inputs and knowledge to inform decisions and, thus, achieve better outcomes and a smoother adoption of the regulations (OECD, 2012[11]). In particular, consultation mechanisms should be transparent and formal to avoid favouring a specific group and to encourage a wider range of contributions. This will improve credibility and legitimise the actions by the regulator (OECD, 2014[2]).

The National Mining Agency has taken steps towards the development of a culture that fosters stakeholder engagement and transparency in decision-making. This change has been welcomed by a significant number of stakeholders, as before the creation of the Agency, there were limited opportunities for key actors to take part on the elaboration of rules and policies.

Public consultations and public hearings are part of ANM's rule-making process. Currently, engagement with relevant actors is done through different channels—their usage varies according to the topic, methodology and objective of the consultation. The Law of Creation of ANM and the Law of Regulatory Agencies dictate that engagement with stakeholders is required as part of the tasks that ANM should undertake before the enactment or modification of regulatory provisions. Public consultations and hearings tend to take place before the definition of the preferred regulatory proposal and for a minimum period of 45 days (Resolution by ANM No. 43/2020). Stakeholders are able to provide comments and feedback to the RIA and supporting material (such as preliminary studies). The comments received by ANM are publicly available through a comments matrix that includes ANM's reaction to the inputs.

Besides public consultations on specific regulatory matters, ANM has also established other communication channels with its stakeholders. The *tomadas de subsídio* allow Directors or the administrative areas of ANM to invite the public or specific stakeholders to provide comments on specific matters (for instance, reduction of the regulatory stock). During these processes, the Agency may provide technical data, relevant documents or other materials as background information to encourage the reception of feedback from the relevant actors. Box 4.6 shows how stakeholders were engaged in the reform process of the mining regulations in South Australia.

Box 4.6. Stakeholder engagement in the Australian mining sector

Department of Energy and Mining, South Australia

In 2016, the Department of Energy and Mining (DEM) of South Australia embarked in a major revision of the main mining regulations in the state with three central objectives in mind (Department for Energy and Mining, 2020[17]):

- Streamlining of the regulatory process for exploration a mining activities
- Increase transparency, enforcement and compliance
- Introduce modern environmental enforcement in which rehabilitation is done in line with government approvals

A key result from this reform exercise was the amendment of the *Statutes Amendment (Mineral Resources) Act* in 2019. As such, in 2020 the DEM carried out an extensive consultation with stakeholders on the draft regulations that derive form the update of the Mineral Resources act, namely the draft Mineral Regulations, the draft Opal Mining Regulations, and the draft Mines and Works Inspection (Mine Manager) Variation Regulations.

Stakeholders were informed in advance of the consultation process. The DEM used different communication channels (e.g. social media, posters, targeted emails, and the Department's website) to ensure that the information reached all the relevant stakeholders in a timely and adequate manner. The public consultation extended for 6 weeks and, during that time, the DEM engaged with stakeholders through webinars, queries, and emails, among others. Given the scope of the regulations under consultation, the DEM grouped them in three overarching topics. Each bundle was set for public consultation along with guidance material and explanatory and supporting documents. The three groups of regulations were:

- Land access, exploration licences and mineral claims
- Compliance and enforcement, including the mining register, royalties and financial issues, opal mining, and mining managers
- Operating approvals

The feedback received during the consultation led to changes being introduced to the draft regulations.

Source: Department for Energy and Mining, (2020[17]), Mining Regulations Consultation Report, https://www.energymining.sa.gov.au/__data/assets/pdf_file/0005/375008/Mining_Regulations_Consultation_Report.pdf (accessed 10 June 2021).

ANM has deployed several strategies to engage with the largest number of stakeholders as possible. The Agency uses social media platforms and its website to encourage participation in the scheduled consultations, which can take place through digital means and/or physical meetings. Since parties regulated by ANM vary broadly in size, resources available and location, the most effective channel so far has been the digital one.

Funding

Adequate funding, in terms of the amount and source of the resources, is an important element for the correct functioning of a regulatory agency. Suitable resourcing allows regulators to fulfil their objectives, to offer competitive conditions to staff members and to diminish the influence from the sector ministry and other actors. The sources of the regulator's funding should be legally defined and be in line with its needs, which include investment, programmes and day-to-day operations (OECD, 2017[18]). Moreover, the regulator's budget should be negotiated on a multi-year basis to ensure its protection from external influences and to encourage medium and long-term planning and investments.

The legislature ought to avoid threatening factors to the regulatory agency's financial independence such as budget appropriations. Restraining the amount of resources available based on the political or economic context in the country might be detrimental for the regulator's performance, especially if this is done on a year-to-year basis. If budget appropriations are necessary and justifiable, it is recommendable to pre-define a period (say, two years) where the limitations would be applied. It is important to emphasise that the legislature or the relevant body determining these financial restrictions should explain the rationale behind these measures and be as transparent as possible in the budget negotiation process.

At the time of creation of ANM, it was agreed that the new regulator would have the same budget as the former DNPM, despite the fact that the agency's functions were broader. The DNPM was already facing financial constraints (Tribunal de Contas da União, 2014[19]), which were further aggravated when the oversight of the sector was transferred to the Agency (Tribunal de Contas da União, 2020[6]). These conditions have limited ANM's *de facto* ability to comply with all of its objectives and has incurred in trade-offs, as certain functions have been prioritised (for instance, inspections of tailings dams) over others.

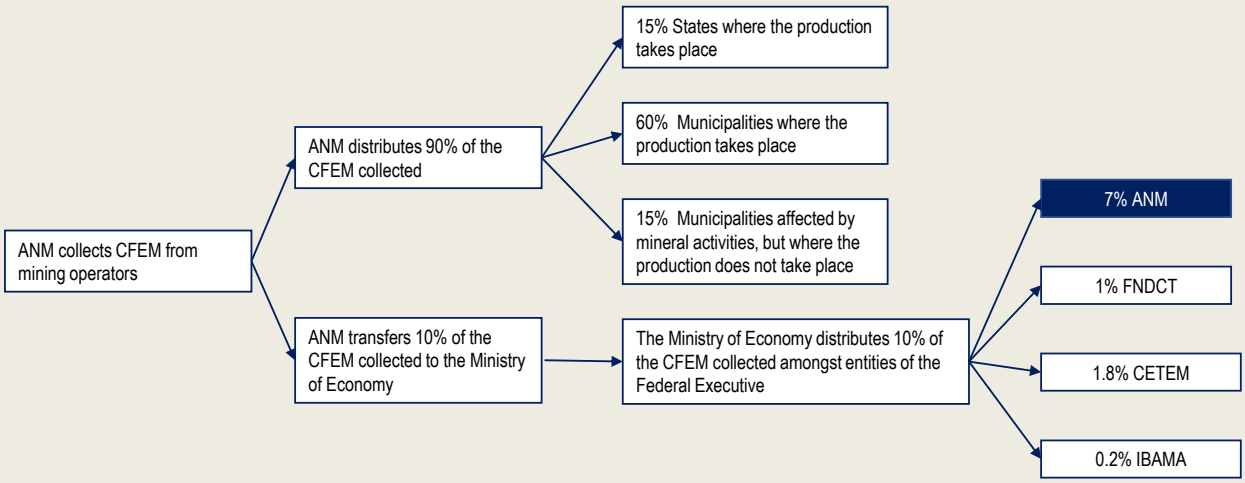
Although the legislation grants the National Mining Agency with the financial resources to fulfil its objectives, actions have been taken to restrict the amount of funds allocated to it. Article 19 of the Law Nº. 13.575/2017 defines ANM's funding structure and sources of revenue, being the Financial Compensation for Mineral Exploration (CFEM) the most relevant one (see Box 4.7 for a complete list of ANM's revenue sources). The CFEM is levied on projects that are on the exploitation phase and is collected from private agents by ANM. The Agency distributes the resources from mining royalties among several institutions and sub-national governments (see Figure 4.1), including the Federal government who then is responsible for approving the budgetary envelope for ANM. While ANM is entitled to 7% of the CFEM that it collects, in reality it has received only a fraction of this budget allocation, approximately 3% of the total CFEM collected. On the other hand, ANM is entitled to the resources that it collects from selling or renting property under its ownership. A modification in the auctioning process (now it is done online) has helped improve the revenues collected using this system and during the first three of these auctions, the Agency collected approximately BRL 237 000 000.

Given that the Agency's funding is negotiated on a yearly basis, it has been difficult for ANM to carry out long-term investments as there is uncertainty regarding the next period's budget. This is an issue that has been acknowledged by a wide range of stakeholders in the sector, and while the economic context of the country is of great importance, it should not hinder the performance of a regulatory agency. One avenue to tackle this situation (at least in part) could be the definition of multi-year funding needs that build on ANM's Strategic Plan 2020-2023 (ANM, 2020[20]). This could help the Agency plan long-term investments (such as those aimed at improving its technological capacities) and would protect its financial independence from government expending ceilings or restrictions like the ones in place since 2019. Financial limitations have also affected the Agency's workforce, as salaries are not competitive in comparison to the private sector, or event, to other regulatory agencies in Brazil. In this regard, the Board of Directors of ANM as well as the Ministry of Mines and Energy have expressed their concerns to the Ministry of Economy, which is the institution that elaborates the proposed budget law for the year.

Box 4.7. Revenue sources for ANM

- The product of credit operations conducted in the country and abroad
- The sale of publications, resources from inspections and surveillance services or those from seminars and courses
- The Annual Tax per Hectare (TAH)
- Resources from agreements or contracts concluded with public or private parties
- Donations, bequests, subsidies and other resources intended for them, including donations of assets and equipment intended for the ANM, for the purpose of compensation for damage caused by misuse of mineral resources due to illegal mining.
- Allocations consigned to the Union's overall budget, special credits, transfers, loans
- Resources from the sale or rental of moveable or immovable property under their ownership
- The product from auctioning off the assets and equipment found or seized stemming from illegal mining operations
- 7% of the amount collected as Financial Compensation for Mineral Exploration (see Figure 4.1 for a complete diagram of the allocation of CFEM across entities in the mining sector).

Figure 4.1. Distribution of CFEM collected from regulated parties



Note: ANM: National Mining Agency (*Agência Nacional de Mineração*); FNDCT: National Fund for Scientific and Technological Development (*Fundo Nacional de Desenvolvimento Científico e Tecnológico*); CETEM: Centre of Mineral Technology (*Centro de Tecnologia Mineral*); IBAMA: Brazilian Institute of Environment and Natural Renewable Resources (*Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis*).
Source: Law No. 8.001/1990 and Law No. 13.575/2017.

As mentioned above, the total amount of funds that ANM receives through the Annual Budget Law (*Lei Orçamentária Anual*, LOA) is variable and uncertain. The Federal government can allocate resources aimed to regulatory agencies to its Contingency Reserve, a fund meant to help balance the national's budget. As shown in Table 4.4, in 2020 approximately 41% of the resources that were originally granted to ANM through the LOA were transferred to the Contingency Reserve, significantly reducing the scope of manoeuvre of ANM. While the budgetary restrictions in the country generate limitations in several regulatory agencies, ANM is a newly created agency that inherited a structure that requires significant investments to meet the expectations of the sector and the public regarding its performance. The monetary constraints also impact ANM's ability to improve its equipment and technological tools, which the Agency needs to streamline its processes and improve its operation. ANM has received donations from third parties (mainly the private) to offset the limitations in terms of technological equipment and software; however, this practice may lead to perceived or actual risks of capture and should not be seen as a permanent solution to ANM's financial constraints.

Table 4.4. Budgetary distribution, National Mining Agency

Brazilian Reais

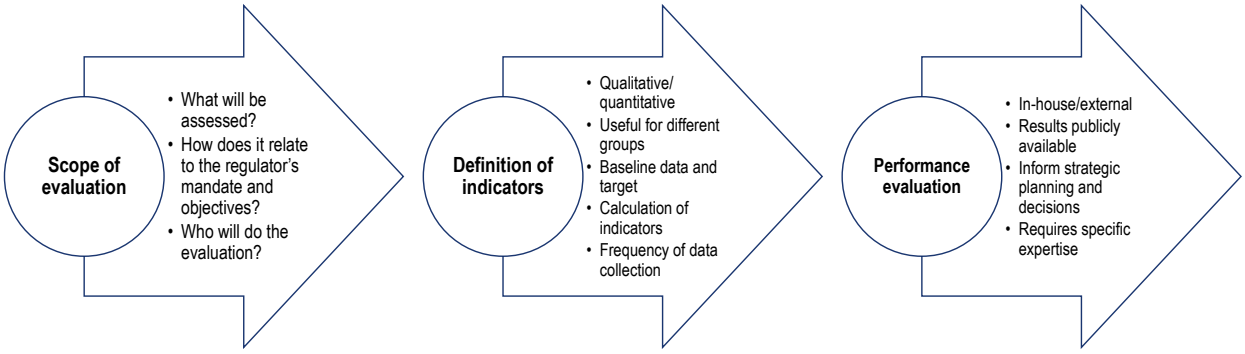
	2018	2019	2020
Total income (LOA)	974.947.314	615.484.239	562.094.899
Contingency reserve	627.075.697	257.819.031	233.643.405
Income received by ANM	**347.871.694**	**357.819.031**	**328.451.494**

Note: Income received by ANM = Total income (LOA) – Contingency reserve. It is important to mention that the National Mining Agency can receive additional credits by the Ministry of Economy, which increase the amount of funds for the Agency.
Source: Câmara dos Deputados (2021[21]), *LOA – Lei Orçamentária Anual*, https://www2.camara.leg.br/orcamento-da-uniao/leis-orcamentarias/loa (accessed 8 March 2021).

Performance evaluation

Assessing a regulatory agency's performance against a set of goals is important to foster continuous learning and improvement (OECD, 2014[2]). To ensure a sound evaluation system, it is essential that regulators plan evaluations in advance, define their scope and resource allocation. It is important to define indicators and monitoring activities, which will provide qualitative and quantitative inputs to carry out the performance assessment of the regulator. Finally, staff and higher management should not see evaluations as a critique on their work, but as a tool that sheds light on the opportunity areas and as an instrument that fosters trust and transparency. Figure 4.2 shows some of the key aspects that a regulatory agency should bear in mind when carrying out a performance evaluation. Results from evaluations should be made publicly available in user-friendly formats that allow stakeholders to consult them and hold accountable the agency.

Figure 4.2. Key aspects of performance evaluation



Source: (Vági and Rimkute, 2018[22]), Toolkit for the preparation, implementation, monitoring, reporting and evaluation of public administration reform and sector strategies: Guidance for SIGMA partners, OECD Publishing, Paris, https://doi.org/10.1787/37e212e6-en.

ANM's performance and strategic indicators are described in its Strategic Plan (ANM, 2020[20]). The process for the definition of these indicators and the targets included the participation of several administrative and managerial areas of the Agency and were approved by the Collegiate Board. The Strategic Plan describes the targets for the next four years.

The Agency's performance is assessed through internal and external audit processes. The Internal Audit Unit monitors and assesses organisational processes against goals previously defined. Additionally, it offers guidance on risk management and on the legality of specific actions. The Unit publishes the Annual Plan for Internal Audits (*Plano Anual de Auditoria Interna,* PAINT), which lists the audits that will take place during the year. The document states the objective of each audit exercise planned for the period and mentions the amount of human resources and human hours that will be allocated to a given audit. Finally, ANM has elaborated a manual that specifies the technical elements that internal auditors should consider when carrying out their duties.

The Federal Court of Accounts (*Tribunal de Contas da* União) is the entity responsible for external audits of ANM. It performs inspections and audits by its own initiative or by request from the Congress. The TCU has assessed and offered recommendations to improve the Agency's resource structure and its governance arrangements. Additionally, after the tailings dams' accidents of Brumadinho and Mariana, the Court carried out specific analysis on the DNMP's and ANM's management and inspection of these structures (Tribunal de Contas da União, 2016[4]) (Tribunal de Contas da União, 2019[5]).

Administrative simplification in the National Mining Agency

The mineral sector in Brazil has been characterised by high administrative burdens. Red tape hinders the development of the industry and may influence the incentives for regulatory compliance. Putting in place a regulatory system that is clear, predictable and that follows a risk-based approach to its design and implementation could unlock significant benefits for the sector and the country as a whole (see Chapter 1 on the relevance of the mining sector in Brazil). In recent years, ANM and the Federal government have introduced several measures aimed at easing regulatory burdens using regulatory policy tools and digitalisation.

In 2019, the National Mining Agency launched an initiative to review and reduce its regulatory stock with the objective of simplifying requirements and legal dispositions and eliminating obsolete provisions. The project derives from Decree 10.139/2019, which requires regulatory agencies to assess and consolidate the normative acts such as decrees (or lower in the legal system hierarchy). Furthermore, in 2020 ANM opened a public consultation (*tomada de subsídios*) during two months, to gather the views of stakeholders on the matter and identify priority areas for the reduction of administrative burdens and regulatory guillotine. When implementing burden reduction programmes, the Agency should consider the appropriateness, effectiveness, efficiency and alternatives of the regulatory provisions under scrutiny (OECD, 2020[23]). Repealing regulations should not be an end on itself and must be accompanied by an assessment of the costs and benefits that each provision entails.

An important source of red tape for mining operators is the granting of titles for the exploration and exploitation of mineral resources. Delays have compounded over the years and currently the Agency faces a backlog of 20 000 requests for exploration permits and approvals face delays. Elements such as the lack of a standard management of the petitions, the limited use of ICT tools and the heterogeneity in the interpretation and application of the regulations by ANM's regional offices, hinder the administrative simplification efforts. It is worth pointing out that the law of creation of the Agency lays down obligations for ANM to increase transparency in administrative processes. One concrete step to tackle these factors is the creation of a working group with officials of the National Mining Agency and the Ministry of Mines and Energy has been created (Ordinance 136/2019) to evaluate and streamline the processes, reduce the response time and get rid of administrative liabilities linked to the granting of mining exploration and exploitation concessions.

Moreover, the Agency is in the process of streamlining its procedure for public tenders, specificially of available areas for mining activities. Through the implementation of a digital system that is user friendly and that promotes transparency, ANM has carried out three public auctions to put back in the market the available areas. Due to failed exploration permits, devolutions, and overdue grants, approximately 56 000 areas have accumulated over the years. The public consultations are livestreamed through the Agency's YouTube channel have been positively received by stakeholders.

The Agency has underscored the importance this topic and has set goals to cut BRL 1 500 million in regulatory burdens by 2023 (ANM, 2020[20]). To achieve this goal, the Federal government and ANM have introduced several initiatives and regulatory modifications to streamline processes, improve the business environment and increase the uptake of technological solutions. Furthermore, the Decree No. 10.389/2020 approves the integration of mineral projects to the Investment Partnerships Programme, which aims at streamlining processes and licences for projects that involve minerals of strategic interest for the country. Projects that are part of the programme benefit from greater interaction across government agencies, smoothening environmental licensing and other formalities.

Economic Freedom Law and its bylaw

The Economic Freedom Law (Law No. 13.874/2019) represents a turning point in terms of the administrative simplification policy in Brazil, as it considers elements such as risk and proportionality. It was enacted in September 2019 with the objective of "protecting the free initiative and the free conduction

of economic operations". The Law and its Bylaw (Decree Nº. 10.178/2019) lay down the rules for the implementation of the "silence-is-consent" rule, which grants the automatic approval of low-risk processes in case the authority fails to provide an official response. Agencies are the ones who define the deadlines for each process as well as which processes that are subject to the "silence-is-consent" rule. It is important to underscore that environmental regulations are not subject to the provisions on the Economic Freedom Law.

This law provided the legal support to reduce administrative burdens in ANM by implementing the "silence-is-consent" rule and defining maximum response times for low-risk activities. In line with the latter, in 2020 the Agency enacted the Resolution ANM 22/2020, which lists a set of administrative procedures and their respective maximum processing times. Tangible benefits from this measure include the reduction from 2 years to 34 days in the time it takes ANM to process a research authorisation for those areas that do not overlap with conservation areas, Indigenous reservations, other granted areas, among others.

Digital Protocol

The Digital Protocol is a digital one-stop shop where mining operators can perform administrative formalities and request services from ANM. The Protocol is an important milestone towards the reduction of administrative burdens, as it reduces significantly transaction costs for mining operators and for ANM's officials. However, the digitalisation of processes should also go hand-in-hand with their simplification and re-engineering, to avoid transferring red tape and inefficiencies to the digital sphere. So far, elements such as the ease of implementation, the low budgetary requirements or fast gains have driven the digitalisation efforts. At the time of preparation of this report, there were 180 procedures available in the portal. See Box 4.8 for more information of the principles that underpin successful one-stop shops in OECD countries.

Box 4.8. Reducing administrative burdens through one-stop shops

Best Practice Principles: One-Stop Shops for Citizens and Businesses

One-stop shops are important tools that can help reduce administrative burdens for regulated parties and for the administration, improve service delivery, and reduce transaction costs. They should be part of a broader administrative simplification strategy and must be centred on the users' needs to encourage their uptake and unlock all their potential benefits. The OECD has identified 10 specific principles that administrations should follow in order to implement successful and sustainable one-stop shops. The principles are:

1. **Political commitment:** Long-term political support is critical for the development of one-stop shops. This support should be accompanied by continuous communication and feedback loops between the political and administrative levels to foster the development, implementation and improvement of the one-stop shop.
2. **Leadership:** Managers of one-stop shops should be clear and committed to the objectives of the one-stop shop and be realistic about their plans and scope. Flexibility and experimentation are key to foster continuous improvement activities.
3. **Legal framework:** The regulatory framework should allow for co-operation with other agencies to maximise the benefits for users.
4. **Co-operation and co-ordination:** Communication, co-ordination and feedback between the areas responsible for the design of the one-stop shop and the implementing areas are critical. Systemic engagement between the relevant agencies and with the users is key.

5. **Role clarity:** Define clear objectives and expectations for the one-stop shop. Gather inputs from users through focus groups, surveys and pilots to tailor the one-stop shop to their needs and experience.
6. **Governance:** The governance structure should include the high-level participation of all agencies involved in the one-stop shop, this will allow for political commitment. The leading agency of the one-stop shop should be in charge of operative decisions.
7. **Public consultation:** Gather the users' perspective through public consultations. Include pilots to test the services and foster feedback loops where the findings of one implementation phase are used to improve the next one.
8. **Communication and technological considerations:** Take into account the users' needs and accessibility demands and use the adequate channels and communication methods to benefit users.
9. **Human capital:** Provide specific training programmes for one-stop shop staff, focusing on technical and interpersonal/social skills.
10. **Monitoring and evaluation:** Define quantitative and qualitative indicators and evaluation methods that will allow for an assessment of the success of the one-stop shop and encourage its continuous improvement.

Source: (OECD, 2020[24]).

Mining Plan (Plano Lavra)

The Mining Plan (*Plano Lavra*) addresses some of the challenges imposed by the COVID-19 pandemic on the Agency's performance and on the mining operators. Its main objective is to de-bureaucratise a series of administrative formalities that regulated parties perform and to improve the business environment. The Plan states 11 key actions, a timeline for their completion and their legal support. For instance, the restrictions for performing *in loco* inspections due to safety and health limitations triggered the revision of low-risk procedures such as the emission of the Utilisation Guide (*Guia de Utilização*). Before, an inspection by ANM personnel was a necessary requirement for the approval of the Utilisation Guide, leading to burdensome procedures that did not follow a risk-based approach. It is important that after the COVID-19 pandemic, the Agency carries out an *ex post* evaluation of the measures put in place, this will provide information into their effectiveness and efficiency.

The case for applying better regulation measures to inspection and enforcement activities

"Inspections are one of the most important ways to enforce regulations and to ensure regulatory compliance", still it is not possible nor efficient to perform verifications of all the regulated parties in a country (OECD, 2018[25]). Resources should be targeted following transparent and informed criteria in order to achieve better and more efficient public policy outcomes. While in Brazil the National Mining Agency is responsible for the inspection and enforcement of the mineral regulations, other institutions and inspectorates also have a role overseeing regulatory compliance in the mining sector. Inspections and enforcement actions in the mineral sector have been in the spotlight since the accidents of Mariana (2015) and Brumadinho (2019). Therefore, ANM has shifted most of its regulatory enforcement resources to the supervision of tailings dams, leaving other aspects of the mineral operations in the back burner. These trade-offs are to some extent understandable; nonetheless, it is important that the Agency develops and implements a detailed and articulated policy on regulatory enforcement and inspections (see Box 4.9 for a list of 12 principles for better inspection and enforcement activities).

Box 4.9. Better inspection and enforcement activities to ensure higher compliance

OECD Regulatory Enforcement and Inspections Toolkit

Regulatory enforcement and inspection activities are a necessary component of an efficient and high-quality regulatory system. The 12 principles covered in the Toolkit provide a tool for assessing the way an institution is promoting and ensuring compliance with regulations.

1. **Evidence-based enforcement:** deciding what to inspect and how should be grounded on data and evidence, and results should be evaluated regularly.
2. **Selectivity:** inspections and enforcement cannot be everywhere and address everything, and there are many other ways to achieve regulations' objectives.
3. **Risk focus and proportionality:** the frequency of inspections and the resources employed should be proportional to the level of risk and enforcement actions should be aiming at reducing the actual risk posed by infractions.
4. **Responsive regulation:** inspection enforcement actions should be modulated depending on the profile and behaviour of specific businesses.
5. **Long-term vision:** clear objectives should be set and institutional mechanisms set up with clear objectives and a long-term road map.
6. **Co-ordination and consolidation:** less duplication and overlaps will ensure better use of public resources, minimise burden on regulated subjects, and maximise effectiveness.
7. **Transparent governance:** Governance structures and human resources policies for regulatory enforcement should support transparency, professionalism, and results-oriented management. Execution of regulatory enforcement should be independent from political influence, and compliance promotion efforts should be rewarded.
8. **Information integration:** Information and communication technologies should be used to maximise risk-focus, co-ordination and information-sharing – as well as optimal use of resources.
9. **Clear and fair process:** coherent legislation to organise inspections and enforcement needs to be adopted and published, and clearly articulate rights and obligations of officials and of businesses.
10. **Compliance promotion:** Transparency and compliance should be promoted through the use of appropriate instruments such as guidance, toolkits and checklists.
11. **Professionalism:** Inspectors should be trained and managed to ensure professionalism, integrity, consistency and transparency.
12. **Reality check:** Institutions in charge of inspection and enforcement should deliver the performance that is expected from them – in terms of stakeholder satisfaction, of efficiency (benefits/costs), and of total effectiveness (safety, health, environmental protection etc.).

Source: OECD (2018[25]), One-Stop Shops for Citizens and Business, OECD Best Practice Principles for Regulatory Policy, OECD Publishing, Paris, https://dx.doi.org/10.1787/b0b0924e-en.

As mentioned above, ANM has focused its inspection resources in the enforcement of safety standards and regulations in tailings dams. Currently, there are 862 dams in the Integrated System for the Management of Mining Dams Safety (*Sistema Integrado de Gestão de Segurança de Barragens de Mineração,* SIGBM), of which 436 are part of the National Policy for Dams Safety. The latter are dams with a greater risk profile, and as such are subject to more stringent scrutiny by ANM. Tailings dams, as well

as other elements of mining operations, are subject to inspections by ANM, the Labour Inspectorate, among others. In particular, these two entities suffer from a shortage of inspectors, which limits their ability to perform verification activities efficiently. While ANM has engaged 40 new temporary and 40 permanent inspectors for this topic, the Labour Inspectorate has had the same number of inspectors for over 20 years (the last public contest took place in 2013).

Regulatory enforcement activities in the National Mining Agency have been characterised by a high degree of discretion and low use of digital tools. The deployment of ICT tools can enable a better management of data and evidence to define enforcement activities and to reduce the need for *in situ* verifications. In some cases, physical inspections have been carried out despite they are not a regulatory requirement and have caused additional delays in the granting of mineral titles or beginning of operations. The integration of information through interoperable databases and exchange of information with other regulatory agencies are key to inform policy-making. This will streamline processes and free resources for other critical activities that require physical inspections. In 2019, ANM managed to visit 51% of the tailings dams that it had planned to inspect due to a lack of staff. Evidence is a necessary input to define an adequate inspections and enforcement strategy, where the principles described in Box 4.9 are implemented.

It is worth highlighting that the Agency is taking steps to address administrative burdens in inspections and enforcement activities. On the one hand, ANM in collaboration of the Ministry of Mines and Energy is in the process of addressing under-resourcing in terms of software, technical equipment and IT tools. The latter is part of an effort by the Brazilian government to update and grant ANM with the adequate tools to improve its performance. Supplementary to these actions, ANM published Resolution No. 59/2021 that defines the criteria for the implementation of mutual technical co-operation agreements with sub-national administrations (states and municipalities) to assist the Agency in mining inspections and monitoring. The Resolution sets the characteristics and attributions that technical teams in the sub-national governments must fulfil as a pre-requirement for the implementation of a co-operation agreement. Additionally, ANM aims at reducing administrative burdens for low-risk operations by eliminating inspection activities in the exploration phase. This modification to the inspections system is part of the priority projects for 2022 according to the Agency's Strategic Plan (ANM, 2020[20]).

Box 4.10. Engaging with stakeholders to foster compliance and reduce administrative burdens

New South Wales Resource Regulator, Australia

The New South Wales Resource Regulator (NSW-RR) is responsible, among other things, for the implementation of mine safety and health regulation. It follows a risk-based approach to regulatory compliance that encourages an active involvement with the community and stakeholders. If regulated parties understand their obligations and responsibilities, they are more likely to adopt them and meet the regulator's expectations. Moreover, easy and streamlined processes reduce the administrative burdens that mining operators face, increasing the voluntary implementation of rules. NSW-RR engages with stakeholders and:

- Provides access to relevant and easily-understandable information
- Offers guidance
- Streamlines regulatory processes
- Is understanding of the conditions that businesses and industry face, including regulatory burdens
- Follows a proportional approach to regulatory interventions, as no one-size fits all
- Clearly communicates non-compliances

- Engages with stakeholders to define initiatives that encourage voluntary compliance
- Carries out public consultations on the elaboration of compliance plans.

Source: NSW Resources Regulator (2019[26]), Compliance and Enfrocement Approach, https://www.resourcesregulator.nsw.gov.au/__data/assets/pdf_file/0003/537384/resources-regulator-compliance-and-enforcement-approach.pdf.

Notes

[1] Autarchic institution: Autonomous institution, created by law with legal personality, own assets, and own revenues to carry out activities of the public administration that require, for its better functioning, a decentralised financial and administrative management.

[2] Refers to management positions or head advisors.

References

ANM (2021), *Regulação*, https://www.gov.br/anm/pt-br/assuntos/regulacao (accessed on 21 June 2021). [12]

ANM (2020), *Anuário Mineral Brasileiro*, https://www.gov.br/anm/pt-br/centrais-de-conteudo/publicacoes/serie-estatisticas-e-economia-mineral/anuario-mineral/anuario-mineral-brasileiro/amb_2020_ano_base_2019_revisada2_28_09.pdf (accessed on 23 March 2021). [16]

ANM (2020), *Manual de Procedimentos da Agenda Regulatória*, https://www.gov.br/anm/pt-br/assuntos/regulacao/agenda-regulatoria/pdf/manual_agenda_regulatoria_anm (accessed on 22 March 2021). [14]

ANM (2020), *Planejamento Estratégico ANM 2020-2023* |, http://antigo.anm.gov.br/portal/acesso-a-informacao/acoes-e-programas/planejamento-estrategico/planejamento-estrategico-anm-2020_2023.pdf (accessed on 30 November 2020). [20]

Câmara dos Deputados (2021), *LOA - Lei Orçamentária Anual*, https://www2.camara.leg.br/orcamento-da-uniao/leis-orcamentarias/loa (accessed on 8 March 2021). [21]

Department for Energy and Mining (2020), *Mining Regulations Consultation Report*, https://www.energymining.sa.gov.au/__data/assets/pdf_file/0005/375008/Mining_Regulations_Consultation_Report.pdf (accessed on 10 June 2021). [17]

Department of Energy and Mining (2013), *Administrative Arrangements*, https://www.energymining.sa.gov.au/minerals/mining/mining_regulation_in_south_australia/administrative_arrangements (accessed on 27 May 2021). [10]

Durand, A. and A. Pietikäinen (2020), "The governance of regulators in Latin America: Evidence from the 2018 Indicators on the governance of sector regulators", *OECD Regulatory Policy Working Papers*, No. 13, OECD Publishing, Paris, https://dx.doi.org/10.1787/0e9705e3-en. [13]

NSW Resources Regulator (2019), *Compliance and Enfrocement Approach*, https://www.resourcesregulator.nsw.gov.au/__data/assets/pdf_file/0003/537384/Resources-Regulator-Compliance-and-Enforcement-Approach.pdf. [26]

OECD (2020), *OECD Best Practice Principles for Regulatory Policy: Regulatory Impact Assessment*, OECD Publishing, Paris, https://doi.org/10.1787/7a9638cb-en. [15]

OECD (2020), *One-Stop Shops for Citizens and Business*, OECD Best Practice Principles for Regulatory Policy, OECD Publishing, Paris, https://dx.doi.org/10.1787/b0b0924e-en. [24]

OECD (2020), *Reviewing the Stock of Regulation*, OECD Best Practice Principles for Regulatory Policy, OECD Publishing, Paris, https://dx.doi.org/10.1787/1a8f33bc-en. [23]

OECD (2019), *Innovation Skills and Leadership in Brazil's Public Sector: Towards a Senior Civil Service System*, OECD Public Governance Reviews, OECD Publishing, Paris, https://dx.doi.org/10.1787/ef660e75-en. [8]

OECD (2019), *Recommendation of the Council on Public Service Leadership and Capability*, https://www.oecd.org/gov/pem/recommendation-on-public-service-leadership-and-capability-en.pdf. [9]

OECD (2018), *OECD Regulatory Enforcement and Inspections Toolkit*, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264303959-en. [25]

OECD (2017), *Creating a Culture of Independence: Practical Guidance against Undue Influence*, The Governance of Regulators, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264274198-en. [18]

OECD (2017), *Skills for a High Performing Civil Service*, OECD Public Governance Reviews, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264280724-en. [7]

OECD (2014), *The Governance of Regulators*, OECD Publishing, https://doi.org/10.1787/9789264209015-en. [2]

OECD (2014), *The Governance of Regulators*, OECD Publishing, https://doi.org/10.1787/9789264209015-en. [1]

OECD (2012), *Recommendation of the Council on Regulatory Policy and Governance*, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264209022-en. [11]

Tribunal de Contas da União (2020), *Relatório de Acompanhamento: Estruturação da Agência Nacional de Mineração*, https://pesquisa.apps.tcu.gov.br/#/documento/acordao-completo/acompanhamento.%2520estrutura%25c3%2587%25c3%2583o%2520da%2520ag%25c3%258ancia%2520nacional%2520de%2520minera%25c3%2587%25c3%2583o/%2520/dtrelevancia%2520desc%252c%2520numacordaoint%2520desc/7/%2520 (accessed on 16 April 2021). [6]

Tribunal de Contas da União (2019), *Levantamento de auditoria com o objetivo de analisar os riscos inerentes à fiscalização, cobrança e arrecadação da CFEM*, https://pesquisa.apps.tcu.gov.br/#/redireciona/acordao-completo/%22acordao-completo-2331633%22 (accessed on 5 March 2021). [3]

Tribunal de Contas da União (2019), *Subsídios Técnicos para a Comissão Externa do Desastre de Brumadinho*, https://portal.tcu.gov.br/data/files/40/80/3b/09/b7a1f6107ad96fe6f18818a8/subsidios_tecnicos_comissao_externa_desastre_brumadinho.pdf (accessed on 25 March 2021). [5]

Tribunal de Contas da União (2016), *Auditoria Operacional. Seguranca das Barragens de Rejeitos de Mineracao*, https://pesquisa.apps.tcu.gov.br/#/documento/acordao-completo/barragem%2520do%2520fund%25c3%2583o/%2520/dtrelevancia%2520asc%252c%2520numacordaoint%2520asc/392/%2520 (accessed on 25 March 2021). [4]

Tribunal de Contas da União (2014), *Auditoria Operacional nos Procedimentos de Arrecadação e Fiscalização da CFEM e da TAH no DNPM*, https://pesquisa.apps.tcu.gov.br/#/documento/acordao-completo/*/numacordao:1979%20anoacordao:2014%20colegiado:'plen%c3%a1rio'/dtrelevancia%20desc,%20numacordaoint%20desc/0 (accessed on 7 June 2021). [19]

Vági, P. and E. Rimkute (2018), "Toolkit for the preparation, implementation, monitoring, reporting and evaluation of public administration reform and sector strategies: Guidance for SIGMA partners", *SIGMA Papers*, No. 57, OECD Publishing, Paris, https://dx.doi.org/10.1787/37e212e6-en. [22]

5 Mining regulation in selected countries

This chapter offers a glance of the mining regulation arrangements in three OECD member countries: Australia, Chile, and Mexico. Each case study explains the institutional and regulatory framework that underpins the mining sector in each jurisdiction. In particular, the section describes at length the regulatory setup and the governance arrangements of the regulatory agency or agencies. Additionally, the chapter covers the regulatory policy tools used by mining regulatory agencies in the three countries.

Mining regulation in Australia

Australia is a country with vast natural resources, including large mineral reserves of coal, metal ores, and non-metallic minerals, among others. In the country, there are over 300 mines and 2 200 quarries distributed across all states, the Northern Territory and Christmas Island (Senior et al., 2021[1]). The resources sector is of high relevance for the economic activity and accounted for approximately 9% of the GDP and 60% of the exports' value in 2018-19. The sector employs 1.9% of Australia's workforce and is a source of work for over 6 000 indigenous workers (The Productivity Commission, 2020[2]).

Institutional and regulatory framework for the mining sector in Australia

The regulatory landscape for the mineral sector in Australia is complex, as multiple jurisdictions have a role to play (The Productivity Commission, 2020[2]). The Constitution confers the central government with exclusive powers to draft laws for a limited range of subjects under the scope of the Commonwealth jurisdiction. This is the case for defence, external affairs, environmental matters of national significance, certain heritage aspects, and Commonwealth land or waters beyond some distance limits. Additionally, the Australian Commonwealth government administers policy for mineral and petroleum exploration in offshore areas through the Offshore Mineral Act of 1994 and the offshore petroleum legislation. On the other hand, states have the powers to regulate where the Commonwealth does not have direct influence. As ownership of minerals and onshore and some offshore gas remains under the scope of states and territories, they regulate mining activities in their own territories.

Each state (and territories) has its own legislative framework for the granting of rights, the provision of permits, licences or leases titles for exploration. Sub-national regulation also includes royalties' payment to the State and compensations for owners or occupiers. A range of Commonwealth laws (environmental, employment, foreign ownership and native title) oversees commissioning of a mining project. The following subsection presents the main governance characteristics of the resources regulator in New South Wales.

New South Wales

New South Wales is an important producer of metallic and industrial minerals, as well as of coal. The institutional setup that underpin the mineral industry in the states includes the Resources and Geoscience Division of the Department of Planning and Environment and the New South Wales Resources Regulator (NSW-RR). The Resources and Geoscience Division is in charge of producing geological and geophysical information, grants mining exploration and exploitation authorisations, ensure environmental protection and attract investments to the sector. On the other hand, NSW-RR is the health and safety independent regulator for mines and petroleum sites in the state and is at arm's length of the Department of Planning, Industry and Environment. The regulatory agency assesses complaints and alleged breaches of the Mining Act, provides guidance about safety regulations, conducts inspections and investigations, and grants licencing among other functions (see Box 5.1 for a general description of regulator's duties). Additionally, NSW-RR's attributions include compliance and enforcement activities, with special emphasis on mine rehabilitation (NSW Resources Regulator, 2019[3]).

NSW-RR's primary objective is on compliance activities within the New South Wales's mining sector, including compliance with the Mining Act and regulating safety and health performance at mines and petroleum sites. The NSW Resources Regulator Strategic Approach for the period 2017-2020 outlines the following priority areas for the sector (NWS Resources Regulator, 2017[4]):

- business improvement to ensure that the regulator has the right systems and tools to regulate effectively
- partnership to improve regulatory performance by working with other actors
- one team to establish an unified and integrated regulatory approach

- industry engagement to ensure that industry understands its obligations and regulator's expectations

Likewise, NSW-RR administrates health and safety obligations to implement an incident prevention strategy governed by:

- Work Health and Safety (Mines and Petroleum Sites) Act 2013
- Work Health and Safety Act 2011
- Explosives Act 2003
- Radiation Control Act 1990

Box 5.1. Attributions of the NSW Resources Regulator

Duties of the New South Wales Resources Regulator include the following:

- receiving and considering complaints, alleged breaches of the Mining Act and safety incident notifications;
- providing information and guidance about safety and other regulatory obligations to protect and support industry, workers, the community and the state;
- conducting probity and compliance checks on applicants for grant/renewal/transfer title applications;
- conducting inspections and investigations;
- assessing licensing, registration applications and grants applications for occupational licences (practising certificates and certificates of competence);
- regulation of exploration activities including the issuing of Activity Approvals and ensuring compliance with title conditions and Codes of Practice;
- taking enforcement action such as issuing prohibition and other statutory notices and taking prosecution action;
- providing advice to the appropriate development consent authority regarding the appropriateness of rehabilitation strategies included in development applications, including advice on conditioning;
- supporting and administering the NSW Mine Safety Advisory Council and NSW Mining and Petroleum Competence Board; and
- administering the mine and petroleum site safety fund (mine safety levy).

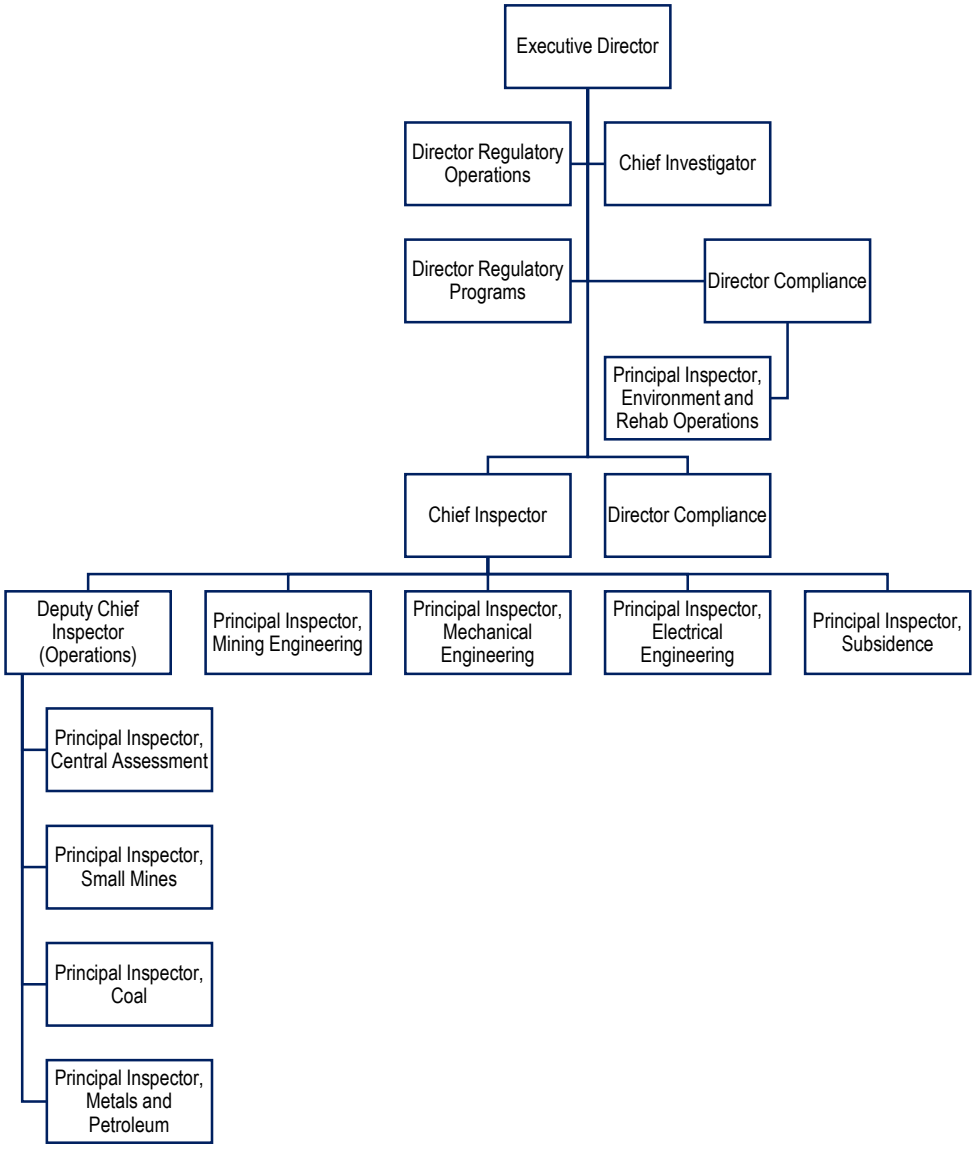
Source: NSW Government (n.d.[5]), NSW Resources Regulator, https://www.resourcesregulator.nsw.gov.au (accessed 5 October 2020).

The Mining Act from 1992 is the main regulatory instrument for mining operations in the state. The act describes the objectives of the regulation and establishes rights, authorisations, restrictions and renewals. It also provides guidance to treat mining activities without authorisation, social provisions, leasing schemes, as well as co-ordination with government authorities. The act also provides a framework for management plans, audits, environmental assessments and royalties (NSW Government, 1992[6]). At the time of preparation of this report, the NSW-RR was conducting a public consultation (until November 2020) to gather feedback on the Standard Conditions of Mining Leases amendment of the Mining Act (NSW Government, 2020[7]).

NSW-RR's organisational structure comprises an Executive Director, who manages the affairs of the agency and provides strategic direction, along with specialised senior staff on inspections, regulatory programmes, regulatory compliance and regulatory operations (see Figure 5.1 for a complete description of the regulator's organisational chart).

Figure 5.1. NSW resources regulator

Organisational structure



Source: NSW Government (n.d.[5]), NSW Resources Regulator, https://www.resourcesregulator.nsw.gov.au (accessed 5 October 2020).

NSW-RR's funding

NSW-RR has two main sources of funding; the mine safety levy and the administrative levy, which are underpinned by the Mine Safety (Cost Recovery) Act 2005 and the Mining Act 1992. The Mine and Petroleum Site Safety Fund gathers the contributions levied on mining industry employers to cover the regulator's costs of implementing mine safety and health rules. The value of the fee is calculated based on

NSW-RR's plan of mine safety and health activities and the regulator's available funds from previous periods. As a measure to ensure transparency and accountability by NSW-RR, the regulatory agency is required to produce an annual report on the way resources are used (NSW Resources Regulator, 2018[8]).

On the other hand, the administrative levy covers the NSW-RR's administrative expenses and the rehabilitation of abandoned mining sites. All mining titles are subject to the tax, which amounts to 1% of the rehabilitation security deposit, with a minimum contribution of 100 AUD (NSW Resources Regulator, 2019[3]).

Engagement with stakeholders

NSW-RR's strategy acknowledges the importance of understanding the sector's needs, operations and challenges (NWS Resources Regulator, 2017[4]). To do this, it gathers feedback and opinions from all relevant stakeholders through different channels during the elaboration or modification of strategic documents and regulations. The regulator focuses its resources and efforts by following the *IAP2 Public Participation Spectrum*, which defines five levels of engagement with stakeholders based on the level of participation expected from the public. The public participation spectrum comprises; inform, consult, involve, collaborate, empower (IAP2 International Federation, 2018[9]). NSW-RR carries out four different kinds of consultations (NSW Resources Regulator, 2020[10]):

- Statutory boards
- Open public consultation
- Targeted stakeholder consultation
- Representative stakeholder steering group

NSW-RR provides feedback on the information collected through the consultation process. It publishes summaries on the submissions and outcomes from the NSW-RR's consideration and notifies participants of the actions taken with respect to their comments (NSW Resources Regulator, 2020[10]).

Compliance and enforcement activities by NSW-RR

NSW-RR's holistic approach to compliance and enforcement follows a risk-based methodology to achieve clearly defined objectives. One of the main assumptions of the regulator is that a successful compliance strategy requires that regulated parties know and understand their responsibilities and are able and willing to comply with them (NSW Resources Regulator, 2019[11]). To ensure that mining operators know what is expected from them, the regulatory agency engages with stakeholders through the provision of information and guidance, and by making clear the compliance priorities for the next six months (NSW Resources Regulator, 2020[12]).

NSW-RR has a wide range of enforcement actions, which grants the regulator enough tools and flexibility promote a long-lasting change in the regulated party's behaviour. The application of enforcement actions is proportional to the level of risk that the non-compliance entails. This means that deliberate or serious non-compliance actions (those that could evolve into events with impacts on the industry, workers, the community and the state) are treated with the most severity, while non-compliance that have a low risk level are managed through a collaborative process (NSW Resources Regulator, 2019[11]).

Regulatory policy, best practices and challenges

Given Australia's fragmented regulatory framework for mining and the amount of regulatory requirements at each stage of mining projects, it is difficult to map the legislative landscape completely (see Table 5.1 for a list of regulatory requirements based on the stage of the project). This situation generates challenges for companies who face administrative burdens and are required to deal with several government institutions during the lifecycle of the mineral operation. According to the Productivity Commission (2020[2]),

there have been few efforts to standardise mineral laws among states; however, since there are common features across the board, the country has a relatively uniform legal approach to mining.

Co-operation among jurisdictions appears to have improved over the last decade; however it is not systematic. One of the avenues that the Australian Administration followed to manage intragovernmental affairs is the creation of the Energy Council by the Council of Australian Governments (COAG). The Energy Council addressed issues affecting investment in resources exploration and development, develop a nationally consistent approach to clean-energy technology, promote efficiency and investment in generation and networks, and other duties that may have impacts on mining activities. Nonetheless, the COAG has been disbanded and a new set of arrangements for improving co-operation are being developed.

Table 5.1. Spheres of regulatory requirement for resources activities

A stylised life-cycle

<table>
<tr><th>Project element</th><th colspan="2">Areas of regulatory requirement</th><th></th></tr>
<tr><td>Tenement and land access</td><td colspan="2">• Tenement (exploration, mining or petroleum licence)
• Negotiation of land access or native title agreement</td><td rowspan="2">Public consultation throughout decision-making processes

Decisions may be subject to reviews or appeals</td></tr>
<tr><td>Assessments and approvals</td><td>• Assessment of project impacts on environmental, social, cultural, heritage and economic factors
• Approval to operate (subject to conditions)
• Post-approvals (management plans, etc.)</td><td>• Other assessments and approvals (safety, permits and licences from a range of agencies)</td></tr>
<tr><td>Operations stage</td><td colspan="2">• Record-keeping and reporting against conditions
• Monitoring of compliance Site rehabilitation (ongoing)</td><td></td></tr>
<tr><td>End of project life</td><td colspan="2">• Rehabilitation
• Site closure and decommissioning</td><td></td></tr>
</table>

Source: The Productivity Commission (2020[2]), Resources Sector Regulation, The Productivity Commission, https://www.pc.gov.au/inquiries/current/resources/draft/resources-draft.pdf (accessed 30 September 2020).

The best regulatory approaches require regulators to deliver clear, evidence-base policy objectives, while imposing the least burden on businesses. Nonetheless, the situation in the Australian mineral sector still has opportunity areas as regulatory requirements during the life cycle of mining projects entail administrative burdens, costs and barriers for investors and lead to negative externalities for citizens and the environment. For this reason, the Productivity Commission has performed an *ex post* evaluation of the regulatory framework to identify main challenges, opportunity areas but also best practices to promote effective implementation of regulation (2020[2]). As part of this exercise, the Commission defined an a series of assessment criteria to identify the best regulatory approaches for the sector (Table 5.2).

Table 5.2. Assessment criteria for leading-practice regulation

Regulatory design	Regulator governance	Regulator conduct
• Objectives of regulation are clearly defined and consistent across different regulations • Consultation during regulation-making is sufficient • Regulation is not overly complex or excessively prescriptive • Regulation is reviewed regularly	• Roles, responsibilities and requirements of different regulatory agencies are clear and duplication is avoided • Decision makers are accountable • Regulators are independent • Regulators are adequately resourced and have necessary capabilities	• Regulators' processes are clear, predictable, open and transparent • Regulators use their resources efficiently • Administrative costs are no higher than necessary

Source: The Productivity Commission (2020[2]), Resources Sector Regulation, The Productivity Commission, https://www.pc.gov.au/inquiries/current/resources/draft/resources-draft.pdf (accessed 30 September 2020).

These assessment criteria helped identify policy issues, opportunity areas and leading practices for the mining sector. Several good practices fall under the scope of regulatory policy tools as public consultation and stakeholder engagement, risk assessment and regulatory impacts, regulatory governance, among others. Furthermore, the evaluation process also provided states and with insights to further improve their regulatory processes and governance. Table 5.3 presents a summary of the main policy concerns and leading practices in mining identified through the *ex post* review performed by the Productivity Commission.

Table 5.3. Policy concerns and leading practices in mining

Regulatory practices in Australia

Subject	Policy issues	Leading practices (examples)	
Resources management	Resources companies are required to navigate a range of regulatory processes in order to explore for and extract resources. There are a number of preconditions for the approval process for resources projects.	To promote data access, confidentiality periods before public release of private exploration and production reports generally should be shorter than the tenure of a project. New South Wales' new regulations are one example of this practice.	Thorough assessments of potential licence holders address the risk of repeated non-compliance. Leading practice involves regulators taking a risk-based approach to due diligence when granting or renewing tenements. While all jurisdictions undertake some due diligence, none fully follows leading practice.
Land access	Each State and Territory has developed processes through which resources companies and landholders can negotiate conditions of land access across the different types of land tenure. This situation can remain contentious.	Requiring early personal engagement between resources companies and landholders can ease potential tensions and be less costly than a negotiated agreement. The Queensland Land Access Code's notification requirements provide a leading-practice example of this approach.	Low-cost dispute resolution methods that take an investigative approach to resolving problems between parties can reduce tensions between landholders and resources companies. The recently established Queensland Land Access Ombudsman provides an example.
Approval processes	Every jurisdiction's environmental approval process is different but there are some common characteristics around Australia. The most pressing issues include: Application through to assessment Approval and conditioning Post-approvals Review process	A leading-practice on environmental impact assessment involves application of a risk-based approach, where the level and focus of investigations are aligned with the size and likelihood of environmental risks that projects create.	Timelines provide information about how long the regulatory processes ought to take. They also focus regulators' attention and public reporting of regulator performance in meeting those timelines. Western Australia and South Australia report on the share of mining proposals and other approvals finalised within target timelines.
Managing environmental and safety outcomes	Several high-profile incidents may be indicative of non-compliance with conditions or ineffective regulations.	Regulators' experiences in monitoring compliance provide useful information about the efficacy of approval conditions in protecting the environment. Leading	Effective regulators continually improve methods, and for actions they could take beyond their routine monitoring and enforcement activities

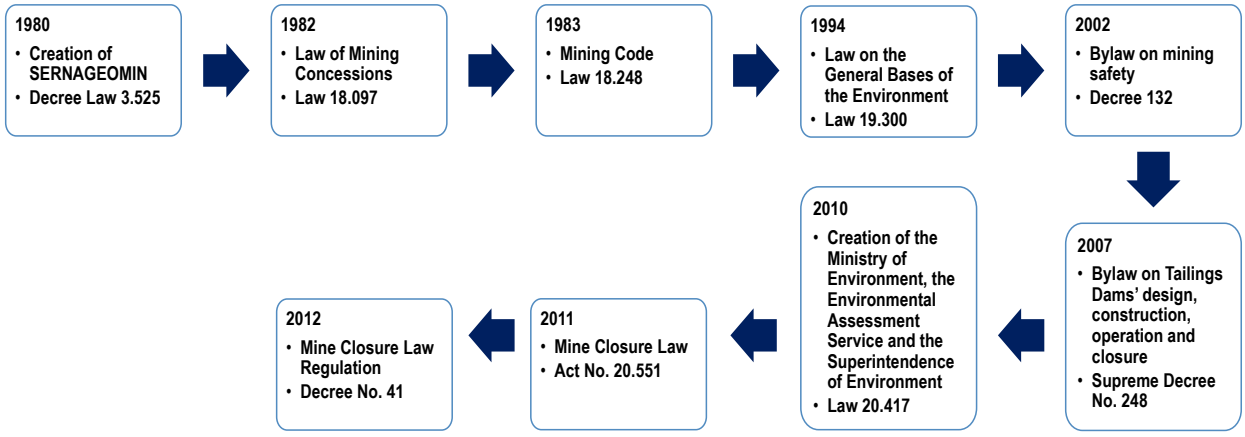
Subject	Policy issues	Leading practices (examples)	
		practice involves regulators employing a "feedback loop" between the compliance monitoring and condition-setting processes, where any findings of redundant or ineffective approval conditions are communicated to the bodies responsible for setting those conditions.	that could address specific problems. The New South Wales Environment Protection Authority's involvement with a study examining emissions from coal trains, and the New South Wales Resources Regulator's targeted programmes provide examples of these practices.
Factors affecting investment	Regulatory processes directly affect the resources sector investment. These include policy and regulatory uncertainty and inconsistency, regulation of industrial relations and other workforce issues, foreign investment policies and taxation.	Early public consultation on new policy proposals, accompanied by clear evidence-based articulation of why a proposed change is the best way of addressing an issue (through regulatory impact assessments) can avoid policy surprises. Clear policy objectives aid consistent and predictable regulatory decision-making. Policy-makers can achieve this by avoiding the use of vague language in policy documents and providing clearly articulated guidance on the intention and interpretation of policies and legislation.	
Community engaging and benefit sharing	Some actors consider that companies should do more to address the negative impacts of resources extraction. While many businesses seek to build relationships with the communities in which they operate to some degree, in some cases there is pressure from the local communities on governments to require some level of benefit sharing.	Guidance on social impacts that should be considered in the approvals process helps to improve the quality of social impact assessments. The New South Wales Government has issued guidance outlining: what social impacts should be considered, how to engage with the community on social impacts, how to scope the social impacts and prepare the assessment.	Co-ordination between local communities and resources companies can improve the effectiveness of benefit sharing activities. Co-ordination can involve formal partnerships, as in Rio Tinto and the City of Karratha, or community consultation, such as that established by Hillgrove Resources in Kanmantoo and Callington
Improving regulator governance, conduct and performance	Regulators face capability challenges and can lack transparency, diminishing the quality of their decisions and imposing unnecessary costs and risks undermining public confidence in regulatory efforts.	Regular independent review and evaluation of regulatory frameworks and objectives drives continuous improvement and ensures they remain fit for purpose. The Independent Review of the New South Wales Regulatory Policy Framework has highlighted that a 'lifecycle' approach for managing regulation over time ensures that frameworks remain fit for purpose.	

Source: The Productivity Commission (2020[2]), Resources Sector Regulation, The Productivity Commission, https://www.pc.gov.au/inquiries/current/resources/draft/resources-draft.pdf (accessed 30 September 2020).

Mining regulation in Chile

Chile established the regulatory and institutional basis for the development of the mining sector in the early 1980s. The introduction of a strong regulatory framework and a peaceful transition to democracy offered the legal certainty and incentives necessary to attract investments to the country in the 1990s. During this decade, the mining industry in Chile became an important driver of economic growth and represented a significant contribution to the country's GDP. The commodities boom (2004-2014) reinforced the role of the mineral activity in the country's macroeconomic context and marked the start of reforms regarding the environmental and fiscal regulation of mining activities. Even after the global decrease of mineral prices, mining – and particularly copper – still represents a major component of the Chilean economy and in 2019 it accounted for approximately 9.4% of Chile's GDP and 56% of its exports (SERNAGEOMIN, 2020[13]).

Figure 5.2. Regulatory framework of mining in Chile



This case study focuses on two main aspects of the mining industry in Chile: its key institutions and the use of regulatory policy tools to the sector.

Institutional framework for the mining industry

The legal framework relevant to the mining sector in Chile allocates the regulatory attributions across several government agencies, with no single mining regulatory agency. The Judicial branch of the government is directly involved in the granting of exploration and exploitation permits and the Executive, through the National Service of Geology and Mines, offers technical advice. While the Treasury is responsible for collecting mining royalties, the Environmental Assessment Service oversees the environmental impact assessment system. The following subsection presents the institutional landscape and describes each of the entities in terms of their attributions and legal framework.

Ministry of Mining

The Ministry of Mining dictates and evaluates the national mining policy in Chile. It fosters the development of the mining industry by supporting investment and promoting the collaboration between the private and public sectors and by reducing regulatory uncertainty. In fact, the latter has been one of the pillars for the development of the mining industry in Chile, as regulations tend to be stable and clear (Poveda Bonilla, 2019[14]). Currently, the Ministry is leading the elaboration of the National Mining Policy 2050, a collaborative effort that involves the participation of a broad number of stakeholders. The policy gathers inputs from residents of all regions in the country and focuses on four thematic areas (Ministerio de Minería, 2020[15]):

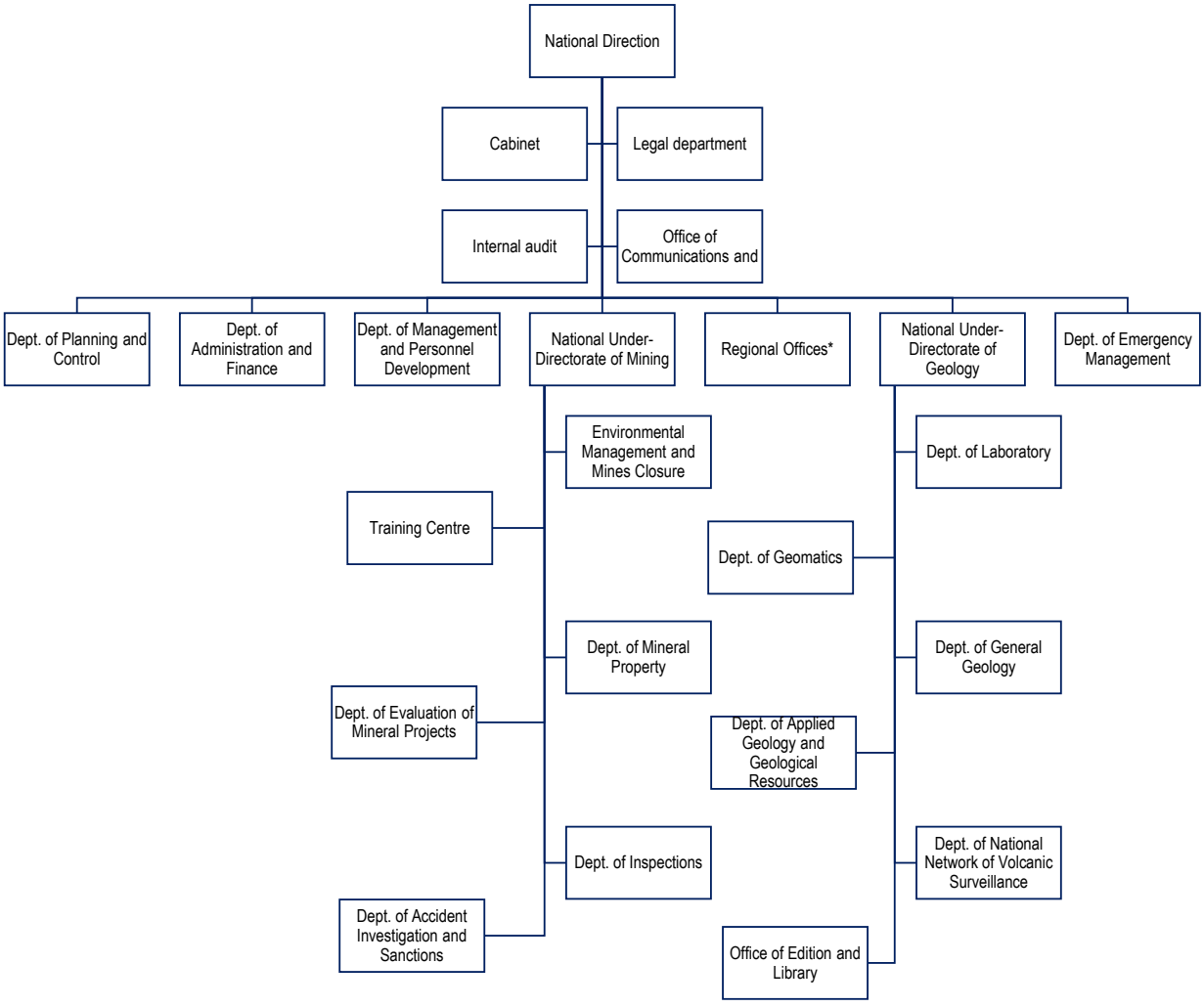
- Economic sustainability of the mining sector
- Environmental sustainability of the mining sector
- Social sustainability of the mining sector
- Governance for sustainability

National Service of Geology and Mines (SERNAGEOMIN)

The National Service of Geology and Mines is a decentralised body from the Ministry of Mines and Energy created by the Decree Law 3.525/1980. SERNAGEOMIN's responsibilities include the inspection and enforcement of mining regulations in terms of safety, property and closure plans, the provision of technical advice to the Courts of Justice in matters related to mining rights and offers technical opinions on projects that have an environmental impact, and the generation, maintenance and spreading geological information of the country.

The decree of creation of the Service defines its governance structure as well as its funding mechanisms. SERNAGEOMIN's structure has four major components: the National Direction, the National Under-Directorate of Mining, the National Under-Directorate of Geology and the territorial offices (Figure 5.3). The President of the Republic appoints the Director of the Service, who in turn designates the Under-Directors. SERNAGEOMIN's budget is composed of the funds granted by the National government, revenue from the provision of services, donations and internal or external financial aid.

Figure 5.3. SERNAGEOMIN's organisational structure



Note: Regional offices include 11 offices across the country.
Source: SERNAGEOMIN.

Beginning of mining activities

Before a mining company can start operations in Chile, it must comply with a series of requirements before the Courts of Justice, the Environmental Assessment Service, among others. While SERNAGEOMIN does not grant the concession titles nor the environmental licence, the Service is engaged in both processes as technical advisor in the case of the Courts and reviewer of specific aspects related to the Environmental Impact Assessments and Environmental Impact Declarations. In general, SERNAGEOMIN offers opinion on the Environmental Impact Assessments and Environmental Impact Statements referring to mining projects (see section on *Environmental Assessment Service* for more details). In particular,

SERNAGEOMIN assesses three kinds of requests (Decree 40/z of the Ministry of Environment, articles 135, 136 and 137):

- Licence for the construction and operation of tailings dams
- Licence to establish a dump of sterile or mineral accumulation
- Permission for the approval of the closure plan of a mineral operation

Between the years 2011-2016, SERNAGEOMIN offered its opinion to 97% of the mining projects that submitted either an Environmental Impact Assessment or an Environmental Impact Statement (Comisión Chilena del Cobre, 2017[16]). Furthermore, SERNAGEOMIN is involved in the assessment of the proposals that enter the Environmental Impact Assessment System regarding the mining activities enlisted in Table 5.4.

Table 5.4. Mining activities comprised in the Bylaw of Mining Safety

Activity
Exploration and prospection of deposits and activities related to the development of mining projects
Construction of mining projects
Exploitation, extraction and transportation of minerals, sterile, products and sub-products inside the industrial mining area
Transformation and refining of mineral substances and its products
Disposal of sterile, waste and residues. Construction and operation of civil structures for these objectives.
Inland boarding activities of mineral substances and/or their products.
Exploration, prospection and exploitation of natural deposits of fossil substances and liquid or gas hydrocarbons and fertilisers.

Source: Decree 132/2002, Bylaw of Mining Safety.

Once the mining operator receives the mining concession and the Environmental Assessment Service defines the requirements that the mining activity is obliged to fulfil, the operator must prepare and submit to SERNAGEOMIN a proposal detailing the technical characteristics of the tailings dam before its construction for the approval by SERNAGEOMIN (Comisión Nacional de Productividad, 2020[17]). It is worth pointing out that the Service oversees and inspects the design, construction, operation and closure of tailings dams (Supreme Decree 248/2007).

Operation of mining activities

SERNAGEOMIN's Department of Mining Safety and Inspections is responsible for the enforcement of safety regulations when the mining operations are already functioning. It investigates and generates data on mining accidents. The Decree 132/2002 and its modification, the Supreme Decree 34/2013, lay out the safety rules for mining operations in Chile, distinguishing between small mining operations (those that extract 5 000 tons or less per month) and mayor mining projects that extract over 5 000 tons per month. In both cases, regulated companies are required to submit monthly data on mining accidents through the Digital System of Mining Information. Additionally, the Service offers training and capacity-building activities on risk and environmental damage to workers of mining operators in the country.

In environmental terms, SERNAGEOMIN oversees the compliance of Environmental Qualifications Resolutions (*Resolución de Calificación Ambiental,* RCAs) following the inspections plan that the Superintendence of Environment defines. RCAs establish the environmental baseline and requirements that must be fulfilled during the lifetime of the project in accordance to the Environmental Impact Assessment or the Environmental Impact Statement (Comisión Chilena del Cobre, 2017[16]). Inspection plans specify the number of mining operation projects to be supervised each month, in each region. For instance, in 2021 SERNAGEOMIN should carry at least 36 environmental inspections (Resolution No. 2583/2020, Superintendencia de Medio Ambiente).

Closure of mining operations

Regarding the closure of mining operations, the Service oversees, inspects and regulates the mine closure plans that companies submit (Law 20.551/2011). SERNAGEOMIN approves the plans before the beginning of mining operations and verifies that the company complies with the actions described in the plan before it ends all its activities in the mine. The plans should take into consideration the environmental specificities approved by the Environmental Assessment Services through the RCA as well as the economic valuation and economic guarantee.

Environmental Assessment Service

The Environmental Assessment Service (*Servicio de Evaluación Ambiental*) is a decentralised institution from the Ministry of Environment and was created by Law 20.417/2010. It is the entity responsible for the regulation and management of the Environmental Impact Assessment System, which ensures that a given project complies with the relevant environmental regulation and offsets its potential significant environmental impacts. According to the impacts that a project entails, the Environmental Assessment Service can require either an Environmental Impact Statement (*Declaración de Impacto Ambiental,* DIA) or an Environmental Impact Assessment (*Evaluación de Impacto Ambienta,* EIA), with the latter being the more stringent one. An Environmental Impact Assessment is required if the project generates at least one of the following impacts (Law 20.417/2010, art. 11):

- Health risk for the population due to the quantity and quality of the emissions and residues.
- Significant adverse effects on the quantity and quality of the renewable natural resources, including soil, water and air.
- Resettlement of human communities or significant modification to the life systems and customs of human groups.
- Located in or next to populations, resources and protected areas, priority areas for conservation, protected wetlands, glaciers, susceptible to impacts, as well as the environmental value of the area where the project would be located.
- Significant alteration, in terms of magnitude or duration, of the landscape or tourist value of an area.
- Alteration of monuments, areas with anthropological, archaeological, historical and cultural value.

Mining operations require an environmental assessment, which tends to be an Environmental Impact Statement for exploration activities and an Environmental Impact Assessment for exploitation and construction activities. Once the Environmental Assessment Service concludes de evaluation of the EIA or DIA, it emits the Resolution of Environmental Qualification. The RCA contains the final opinion of the Service (e.g. approved, rejected or approved with conditions for the project) and the requirements and conditions that the project will have to fulfil (Superintendencia del Medio Ambiente de Chile, 2018[18]).

Courts of Justice

The local justice courts are responsible for granting the exploration and exploitation concessions in Chile. According to the Organic Law of Mining Concessions (Law 18.097/1982) and the Mining Code, SERNAGEOMIN can provide advice and prepare a report assessing the technical contents of the concession requests, which the courts can use as input for their analysis. It is worth mentioning that in the case of lithium, the concession regime varies from that of other minerals. Since 1979, there are three alternatives for the exploitation of lithium: by state-owned companies, through administrative concessions or through Special Lithium Operation Contracts (*Contratos especiales de operaciones de litio*), which the Ministry of Mines grants and that the Chilean Nuclear Energy Commission must approve.

Chilean Cooper Commission

The Chilean Cooper Commission (Cochilco) is a technical body created in 1976 through the Decree Law 1349/1976. Cochilco's objectives include the development of studies, reports and statistics that support the elaboration, implementation and evaluation of public policies related to the mineral sector in Chile and foster evidence-based decision-making. The Commission provides guidance to the government on topics related to the production of metallic and non-metallic mineral substances (it does not include oil and carbon). Furthermore, the Commission inspects and evaluates the management and investment actions of the state-owned mining companies (CODELCO and ENAMI) and reviews and audits contracts for copper and its by-product exports for all mining companies in the country.

The managing structure of the Commission includes a directive board and an executive vice president. Representatives from the Ministry of Mines, the Treasury, the Central Bank and two representatives appointed by the President are part of Cochilico's directive board. The President of the Republic appoints the executive vice president, who is responsible for the administration and implementation of the resolutions dictated by the directive board. Cochilco's administrative structure is divided in three areas: Research and Public Policies, Investment Evaluation and Strategic Management and Inspections.

Regulatory policy in the mining sector

In Chile, the Ministry of Economy, Development and Tourism and the Ministry General Secretariat of the Presidency lead the regulatory policy agenda in the country. Since 2018, the government of Chile has enacted regulations focused on the promotion of administrative simplification measures and the revision of the regulatory stock (Presidential Instructive No.4/2019). Additionally, Regulatory Impact Reports (*Informe de Impacto Regulatorio)* are mandatory for law proposals from the Executive and presidential or ministerial decrees (Presidential Instructive No. 3/2019).

In the mining sector, administrative simplification measures and sectorial evaluations of regulations have driven the regulatory policy actions. Although these efforts are welcome, there is room for improvement, particularly in terms of licensing and regulatory overlapping across institutions. SERNAGEOMIN and the Environmental Assessment Service have taken steps to digitalise processes and formalities. Moreover, both entities provide guidance for the use of the digital tools in place, which reduces the time that business representatives and citizens devote to understanding and complying with the requirements.

The National Productivity Commission carries out *ad hoc* reviews of key economic sectors for the country with the objective of providing recommendations to improve the national productivity. These reviews complement the administrative simplification measures and provide a *process perspective* that go beyond specific procedures or formalities. In 2020, the Commission published a review of the regulatory quality of key sectors in Chile, including mining. The report provides specific recommendations to improve response times and eliminate overlaps between institutions (e.g. SERNAGEOMIN and the General Direction of Water) as well as highlighting barriers to compliance based on the regulatory requirements (Comisión Nacional de Productividad, 2020[17]).

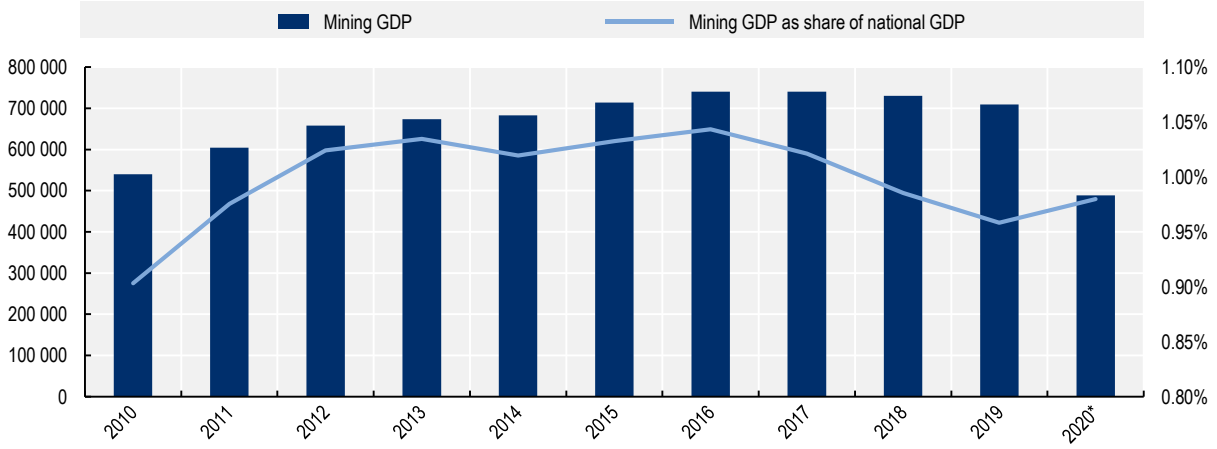
Mining regulation in Mexico

The mining industry in Mexico is an important component of the country's GDP. In 2018, the mining-metallurgical sector, which includes the extractive mining and metallurgy sub-sectors, contributed to around 2.4% of the total GDP and to 8.2% of the industrial GDP. Additionally, it generated approximately 381 000 direct jobs and 2.3 million indirect jobs (Ministry of Economy, 2020[19]). The mining GDP flows account for approximately 1% of the country's GDP (INEGI, 2020[20]). In 2015, the mining industry represented the country's fifth largest source of foreign income, with an export value of USD 17 053 million

(Federal Supreme Audit, 2015[21]). Figure 5.4 shows the total mining GDP and its share as part of the national GDP over the last ten years (2010-20).

Figure 5.4. Mining GDP in Mexico

Millions Mexican pesos (MXN), 2013 prices



* Data for 2020 is up to the third quarter. GDP data does not consider oil and gas.
Source: INEGI (2020[20]), *Banco de Información Económica [Bank of Economic Information]*, https://www.inegi.org.mx/sistemas/bie/ (accessed 18 December 2020).

Mexico is one of the most important mining countries in the world (Ministry of Economy, 2020[19]), due to the ample variety of minerals and the amount of specific minerals that it extracts. It ranks first in silver production worldwide and is among the top 10 producers of 16 different minerals.[1] In 2020, Mexico ranked second in the mining exploration budget in Latin America and fifth worldwide, and fifth in attracting investments for mining during 2018. In terms of direct investment, the mining sector invested USD 4 897 billion in 2018, which meant a 13.8% increase compared to 2017.

Institutions and regulatory powers in mining activities

In Mexico, nine government agencies regulate different aspects of the mining sector, e.g. taxes, labour, the environment, land tenure and the mining activity regulation (see Table 5.5, for more details). However, only two ministries directly regulate the mining policy: the Ministry of Economy (SE) and the Ministry of Environment and Natural Resources (SEMARNAT). The Ministry of Economy is in charge of the promotion, regulation and oversight of the mining activity. Specifically, the SE regulates the mining activities in the country through the General Directorate of Mines (DGM) and General Directorate of Mining Development (DGDM) and through two deconcentrated bodies: the Mexican Geological Service (SGM) and the Mining Development Trust (FIFOMI). It is worth to mention that the SE focuses on the activities before the granting of the concession title. On the other hand, the Ministry of the Environment and Natural Resources focuses on the environmental regulation of the mining activity and carries out its activities mainly through the Federal Environmental Protection Agency (PROFEPA).

Table 5.5. Government agencies with attributions

Government agency	Regulatory attributions
Ministry of Finance	Taxes
Ministry of Labour and Social Security	Labour regulation
Mexican Institute of Social Security	Social Security and Services
Ministry of Environment and Natural Resources	Environmental regulation
Ministry of National Defence	Regulation of explosives use
Ministry of Agrarian, Territorial and Urban Development	Land tenure regulation
Ministry of Economy	Regulation of mining activities

Source: Ministry of Economy (n.d.[22]), Guía de Procedimientos Mineros (Mining Procedures Guide), https://www.gob.mx/cms/uploads/attachment/file/112613/guia_de_procedimientos_mineros_0414.pdf (accessed 17 December 2020). Federal Supreme Audit (2015[21]), Política Pública de Minería [Mining Public Policy], https://www.asf.gob.mx/Trans/Informes/IR2015i/Documentos/Auditorias/2015_1579_a.pdf (accessed 18 December 2020).

The **General Directorate of Mines (DGM)** is the main regulator for the sector. The DGM aims at guaranteeing a transparent implementation of mining regulation and at monitoring its compliance. It is the administrative unit responsible for the granting process of mining concessions and the allocation of titles. The General Directorate authorises the performance of mining works and projects for the exploration and exploitation of minerals. The DGM co-ordinates with all the competent authorities to discharge its responsibilities according to the Mining Law, the Hydrocarbon Law, the Electric Industry Law and all of its bylaws. In particular, the DGM co-ordinates with the General Directorate of Standards for the development and revision of the Mexican Official Standards (NOM) and of the Mexican Standards (NMX) on mining. Additionally, the DGM contributes to the analysis, review, formulation, evaluation and monitoring of provisions that promote sustainable mining, along with the DGDM.

The DGM manages and defines the necessary actions to foster regulatory compliance. To achieve this, it designs and implements the inspection and sanction processes. In case of non-compliance, the DGM is allowed to impose administrative sanctions, and suspend or cancel the concessions' rights of ongoing mining works and projects.

On the other hand, the DGM develops sectoral, institutional, regional and special programmes in mining matters. In addition, it is in charge of requesting and managing the information on production, revenue and destination of minerals, geology of ore deposits and reserves, as well as all economic and accounting statements of mining and metallurgical companies in the country.

The **General Directorate of Mining Development (DGDM)** seeks the development of the mining sector through actions that stimulate investment and competitiveness with a sustainable vision. The DGDM is in charge of disseminating economic information on the Mexican mining industry, as well as of the analysis of the sector. It also establishes collaboration and co-ordination links with private sector organisations to carry out joint actions to promote mining activity and the development of the regions.

The DGDM prepares and disseminates studies on the national and international mining environment and elaborates diagnoses and mitigation proposals for the problems of the sector. Additionally, the General Directorate is in charge of the co-ordination of studies to determine the feasibility of projects in order to promote the exploration and exploitation of the mineral resources.

The **Mining Development Trust (FIFOMI)** provides support through training, technical assistance and financing of SMEs. The financing programme focuses on the exploration, exploitation, beneficiation, industrialisation, commercialisation and consumption of minerals and their productive chain. The objective of the SMEs financing programme is to increase competitiveness in the sector by offering help to:

- Acquire capital goods such as machinery and equipment, industrial warehouses, benefit plants, and investment rescue.

- Permanent and/or revolving working capital.
- Financing of suppliers of goods and services, introducing mineral, contractors, clients in the mining sector and their production chain.
- Lease of machinery, specialised transport equipment and industrial warehouses.
- Pay liabilities with financial institutions, suppliers and creditors that have been generated by activities inherent to the business.

The **Mexican Geological Service's (SGM)** objective is to encourage the best use of the country's mineral resources by promoting and elaborating geological, mining and metallurgical research and to generate the basic geological information of the nation. The SGM is a decentralised body with its own legal personality and assets, which come from the contributions from the Federal Government, discovery bonuses and economic compensation from tenders, income from services it provides and goods it acquires by any other means (Government of Mexico, 2014[23]).

As a specialised office, the SGM advises, supports and certifies mining projects, and integrates a portfolio of projects. Moreover, it has to localise exploration targets and projects, propose areas for competition, promote agreements and give consultancies in the field of exploration and evaluation of minerals.

The **Federal Environmental Protection Agency (PROFEPA)** is a decentralised administrative body of the Ministry of the Environment and Natural Resources (SEMARNAT) with technical and operational autonomy. It seeks environmental justice through the application and enforcement of the federal environmental legislation through inspection, verification and oversight for guaranteeing the protection of natural resources. The PROFEPA aims to prioritise the preventive approach over the corrective one, as well as actions of social participation. PROFEPA carries this out by responding to public complaints and through inspection, verification, oversight and the use of voluntary instruments (Government of Mexico, 2020[24]).

Table 5.6 consolidates the activities that correspond to each of the government bodies in charge of the mining policy in Mexico.

Table 5.6. Mining policy and the responsible agencies

Mining phase	Activities	Government body responsible
Exploration	• Exploration activities of the territory	• Mexican Geological Service • Ministry of Economy
Promotion	• Portfolio of projects • Events and information sharing • Training • Financing	• Ministry of Economy • Mexican Geological Service (SGM) • Mining Development Trust (FIFOMI)
Regulation	• Develop NMXs and NOMS • Implementation of the regulation	• Ministry of Economy • Ministry of Environment and Natural Resources
Operation	• Granting concessions • Environmental permits	• Ministry of Economy • Ministry of Environment and Natural Resources
	• Inspections • Sanctions	• Ministry of Economy • Federal Environmental Protection Agency (PROFEPA)

Source: Federal Supreme Audit (2015[21]), Política Pública de Minería (Mining Public Policy), https://www.asf.gob.mx/Trans/Informes/IR2015i/Documentos/Auditorias/2015_1579_a.pdf (accessed 18 December 2020).

Better regulation tools

In Mexico, regulatory impact assessment and public consultation on draft regulations have been mandatory for all regulatory proposals coming from the executive since 2000. The new General Law on Better Regulation, besides modernising the policy, also establishes the National System of Better Regulation (CONAMER), specifying the duties and responsibilities of autonomous bodies and state and municipal governments (OECD, 2018[25]).

Regarding the emission and supervision of mineral regulations, the Ministry of Economy is responsible for overseeing the development of draft technical regulations and standards by line ministries and agencies, including ensuring the adoption or consideration of international practices. The draft technical regulations and standards must then follow the RIA process defined by the National Commission on Better Regulation. For instance, the addition of a plot to the mineral reserves requires a RIA where market prices of mineral reserves of probable or potential mineral reserves are calculated, as well as the potential benefit of using the plot or its mineral reserves for another activity. Additionally, the Bylaw of the Mineral Law (2012), includes provisions focused on decreasing red tape fostering and administrative simplification. The bylaw defines the maximum number of days that the administration uses to assess a formality or a request.

The National Commission on Better Regulation is a deconcentrated body of the Ministry of Economy with technical and operational autonomy, which aims to promote transparency in the development and enforcement of regulations and the simplification of procedures. CONAMER is in charge of validating the RIAs from draft regulation, overseeing the public consultation process, co-ordinating and monitoring the regulatory planning agenda, promoting simplification programmes and reviewing the existing stock of regulations (OECD, 2018[25]).

Note

[1] Silver, bismuth, fluorite, celestine, wollastonite, cadmium, molybdenum, lead, zinc, diatomite, salt, barite, graphite, gypsum, gold and copper.

References

Comisión Chilena del Cobre (2017), *Análisis del proceso de evaluación ambiental de los proyectos mineros*, https://www.cochilco.cl/Listado%20Temtico/Analisis%20proceso%20de%20evaluaci%C3%B3n%20ambiental%20proyectos%20mineros.pdf (accessed on 3 February 2021). [16]

Comisión Nacional de Productividad (2020), *Calidad Regulatoria en Chile: Una revisión de sectores estratégicos*, https://www.comisiondeproductividad.cl/wp-content/uploads/2020/03/Informe_Calidad_Calidad_Regulatoria_Sectores_Estrategicos-2020-03-11.pdf (accessed on 12 February 2021). [17]

Federal Supreme Audit (2015), *Política Pública de Minería [Mining Public Policy]*, https://www.asf.gob.mx/Trans/Informes/IR2015i/Documentos/Auditorias/2015_1579_a.pdf (accessed on 18 December 2020). [21]

Government of Mexico (2020), *PROFEPA*, https://www.gob.mx/profepa/que-hacemos (accessed on 23 December 2020). [24]

Government of Mexico (2014), *Ley Minera [Mining Law]*. [23]

IAP2 International Federation (2018), *IAP2 Spectrum of Public Participation*, https://cdn.ymaws.com/www.iap2.org/resource/resmgr/pillars/Spectrum_8.5x11_Print.pdf (accessed on 3 May 2021). [9]

INEGI (2020), *Banco de Información Económica [Bank of Economic Information]*, https://www.inegi.org.mx/sistemas/bie/ (accessed on 18 December 2020). [20]

Ministerio de Minería (2020), *Insumos para la Política Nacional Minera 2050*, http://www.politicanacionalminera.cl/wp-content/uploads/2020/06/Insumos-para-la-PNM-2050.pdf (accessed on 4 December 2020). [15]

Ministry of Economy (2020), *Minería [Mining]*, https://www.gob.mx/se/acciones-y-programas/mineria (accessed on 18 December 2020). [19]

Ministry of Economy (n.d.), *Guía de Procedimientos Mineros [Mining Procedures Guide]*, https://www.gob.mx/cms/uploads/attachment/file/112613/guia_de_procedimientos_mineros_0414.pdf (accessed on 17 December 2020). [22]

NSW Government (2020), *Mining Amendment Regulation 2020*, https://www.nsw.gov.au/have-your-say/mining-amendment-regulation-2020 (accessed on 1 October 2020). [7]

NSW Government (1992), *Mining Act No 29*, https://legacy.legislation.nsw.gov.au/~/pdf/view/act/1992/29/whole (accessed on 1 October 2020). [6]

NSW Government (n.d.), *NSW Resources Regulator*, https://www.resourcesregulator.nsw.gov.au (accessed on 5 October 2020). [5]

NSW Resources Regulator (2020), *Compliance priorities: January-June 2021*, https://www.resourcesregulator.nsw.gov.au/__data/assets/pdf_file/0011/1278830/Compliance-priorities-Jan-to-June-2021.pdf (accessed on 29 April 2021). [12]

NSW Resources Regulator (2020), *Policy: Engagement and public consultation*, https://www.resourcesregulator.nsw.gov.au/__data/assets/pdf_file/0008/1205297/Resources-Regulator-Policy-Public-consultation.pdf (accessed on 3 May 2021). [10]

NSW Resources Regulator (2019), *Compliance and Enfrocement Approach*, https://www.resourcesregulator.nsw.gov.au/__data/assets/pdf_file/0003/537384/Resources-Regulator-Compliance-and-Enforcement-Approach.pdf (accessed on 29 April 2021). [11]

NSW Resources Regulator (2019), *Overview of the NSW Resources Regulator*, Government of NSW, https://www.resourcesregulator.nsw.gov.au/__data/assets/pdf_file/0003/819183/Resources-Regulator-Overview.pdf (accessed on 1 October 2020). [3]

NSW Resources Regulator (2018), *Mine and Petroleum Site Safety Levy: Fact Sheet*, https://www.resourcesregulator.nsw.gov.au/__data/assets/pdf_file/0005/71348/Mine-Safety-Levy-fact-sheet-November-18.pdf (accessed on 29 April 2021). [8]

NWS Resources Regulator (2017), *NSW Resources Regulator - Strategic Approach 2017-2020*, NSW Resources Regulator, https://www.resourcesregulator.nsw.gov.au/__data/assets/pdf_file/0004/721390/strategic-approach-2017-2020.pdf (accessed on 1 October 2020). [4]

OECD (2018), *OECD Regulatory Policy Outlook 2018*, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264303072-en. [25]

Poveda Bonilla, R. (2019), *Estudio de caso sobre la gobernanza del cobre en Chile*, Comisión Económica para América Latina y el Caribe (CEPAL), Santiago, https://repositorio.cepal.org/bitstream/handle/11362/44777/1/S1900453_es.pdf (accessed on 4 December 2020). [14]

Senior, A. et al. (2021), *Australia's Identified Mineral Resources 2020*, Geoscience Australia, http://dx.doi.org/10.11636/1327-1466.2020 (accessed on 29 April 2021). [1]

SERNAGEOMIN (2020), *Anuario de la minería de Chile, 2019*, https://www.sernageomin.cl/pdf/anuario_2019_act100720.pdf (accessed on 28 October 2020). [13]

Superintendencia del Medio Ambiente de Chile (2018), *Estrategia de Fiscalización Ambiental 2018-2023*, https://portal.sma.gob.cl/wp-content/uploads/2018/11/estrategia-de-fiscalizacion-ambiental-2018-2023.pdf (accessed on 5 February 2021). [18]

The Productivity Commission (2020), *Resources Sector Regulation*, The Productivity Commission, https://www.pc.gov.au/inquiries/completed/resources/report/resources.pdf (accessed on 30 September 2020). [2]

Regulatory Governance in the Mining Sector in Brazil

Mining plays a crucial role in Brazil's economy. Nonetheless, the efforts and resources devoted to regulatory quality in the sector, including the enforcement of rules, have not always been commensurate. This report identifies the gaps, barriers, implementation flaws and inefficiencies in the regulatory framework of the mining sector in Brazil. It takes stock of the recent reforms in the mining sector in Brazil, identifies areas that pose the greatest challenges for effective regulation in mining. It also describes the reforms that created the National Mining Agency of Brazil, its governance arrangements and its current regulatory practices. These are assessed against OECD principles in regulatory policy and mining regulation, as well as against country experiences from Australia, Chile, and Mexico. Finally, recommendations are provided to support further reform efforts.

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