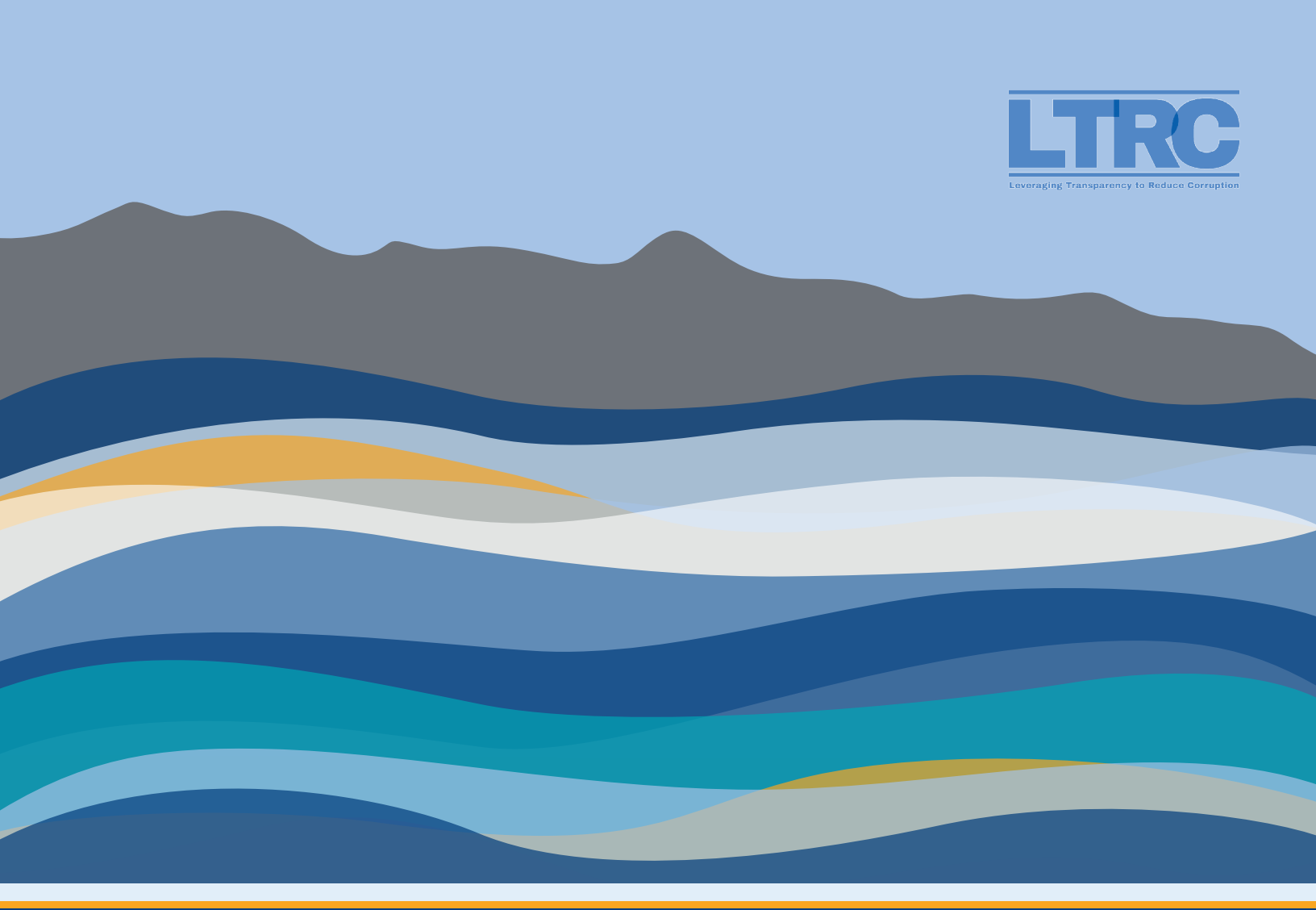

The Future of Mining in Latin America

Critical Minerals and the Global Energy Transition

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Executive Summary

Latin America holds considerable reserves of critical minerals, sometimes also referred to as *future-facing commodities*, which will be crucial to the global energy transition. What the development of these resources in Latin America will mean for governments and citizens is uncertain. The global energy transition presents an opportunity that could translate into significant commodities windfalls. The end goal for governments is a well-regulated mining sector that increases public goods and spurs socioeconomic development with minimized social and environmental impacts. Transparency, accountability, and participation will be crucial to achieving this.

However, two major variables could undermine the ability of governments to deliver on this vision. First, most countries in the region face persistent **conflicts over natural resource governance**, including opposition to mining projects based on environmental impacts, insufficient consultation with affected communities, and inequitable distribution of socioeconomic benefits. Governments have struggled to meaningfully respond to civil society and community concerns and reduce conflict as they face competing pressures, fractured legislatures, and a cacophony of views on mining. These challenges are not impossible to solve through sustained effort and good policy, but it is unclear whether or how governments will be able to address them and, by extension, how overall levels of conflict around mining will evolve.

The second major variable is **uncertainty about future demand** for the four critical minerals. Demand will depend on factors such as the pace of the energy transition and emerging technological developments (for example, identification of replacements for these minerals in key applications or drastic improvements in mineral recycling processes).

The way these two variables interact will determine which of several scenarios might play out for critical minerals development in Latin America. This report explores these potential scenarios in detail.

A best-case scenario would see critical minerals driving a sustainable development boom in Latin America. Governments would be able to meet significant demand growth with mineral development approaches that mitigate the areas of conflict noted above and better serve citizen needs and priorities. This would also benefit the global energy transition by reducing the risks of supply disruptions and mitigating environmental, social, and governance impacts associated with developing the mineral resources needed for clean energy technologies.

As things stand, this scenario is unlikely, given the political and technical challenges involved in implementing more inclusive and broadly beneficial mineral governance. If governments cannot

FIGURE 1. Potential Scenarios for Critical Minerals Development*

meaningfully address persistent conflicts over natural resource governance, these conflicts are likely to increase, particularly if demand for critical minerals surges in the coming years.

In a worst-case scenario, protracted conflicts over mining and confusion about regulatory standards would lead to a range of economic and political difficulties for governments, undercutting their ability to collect rents from the sector, increasing their exposure to arbitration risks, and, in an extreme scenario, producing political instability. This would also hurt the global energy transition, undermining and disrupting supplies of critical minerals.

* Our analysis is intended to illustrate a range of potential possibilities. The scenarios are therefore intentionally drawn starkly. Reality may fall somewhere in between or combine elements of different scenarios. While our intention is to broadly illustrate regional trajectories, it is of course possible that different jurisdictions within Latin America will end up on different paths.

1 Introduction

This report from the Leveraging Transparency to Reduce Corruption project (LTRC) explores potential scenarios in Latin America for the development of critical minerals, also sometimes referred to as *future-facing commodities,* considering ongoing conflicts over natural resource governance and uncertain demand. It also assesses the extent to which each scenario might lead to an end goal of a well-regulated mining sector that increases public goods and spurs socioeconomic development with minimized social and environmental impacts.

We have chosen to focus our analysis on Latin America, even though many of the dynamics we discuss are likely to be broadly relevant to the future of mining in diverse regions around the world. In our view, Latin America is particularly crucial to meeting demand for critical minerals (copper, lithium, cobalt, and nickel), given both existing levels of production and its global share of reserves of copper, lithium, cobalt, and nickel. Chile, Peru, and Mexico hold an estimated 40% of global copper reserves, with additional reserves found in Argentina, Brazil, Colombia, and Ecuador. Roughly two-thirds of the word's global lithium reserves are in Latin America. These are primarily in Bolivia, Argentina, and Chile, although Mexico, Peru, and Brazil are home to smaller shares and host some exploration projects. The region also has sizable nickel reserves—Brazil hosts 17% of global nickel reserves, with additional reserves in Colombia and Cuba—as well as small amounts of cobalt. We therefore believe that the trajectory of mining in Latin America will have an outsized impact on global commodities markets and the global energy transition.

We first describe three areas of natural resource governance that have been central to political and social conflict over the region's mining sector: environmental impacts, consultation with affected communities, and distribution of socioeconomic benefits. Then we go on to explore uncertainties about future demand for critical minerals. Finally, we lay out four potential scenarios for the future of mining in Latin America in the next 10 to 20 years, considering both the level of conflict and the level of demand for critical minerals.

2 Conflicts over Natural Resource Governance

Governments in Latin America are working to boost investment in critical minerals to increase output. However, conflicts over natural resource governance, if left unaddressed, will continue to derail exploration activity, stall project development, and halt operations at producing mines.

Additional investment will be crucial to capitalizing on Latin America's potential to supply critical minerals for the global energy transition. To meet a projected annual supply deficit of 4.7 million tons of copper by 2030, for example, the world would need to build eight mines the size of BHP's Escondida copper mine in Chile, currently the world's largest copper mine, in the next eight years.[1] Chile needs US$150 billion in additional investment to double copper output by 2050,[2] while Peru is seeking roughly US$54 billion for more than 100 projects to develop deposits of copper and lithium, among other minerals.[3] Ecuadorian President Guillermo Lasso is also working to attract investment in mining.[4]

Scaling up production to meet demand is likely to be difficult. Analysis suggests that it takes an average of 16.5 years to move a mining project from discovery to production.[5] Steps to advance sector development are running into resistance on the ground, which is likely to delay timelines. Latin American states have comparatively strong natural resource governance compared to other resource-rich countries around the world. Colombia and Peru's mining sectors both scored 75 on the Natural Resource Governance Institute's 2021 Resource Governance Index, achieving the highest rating of Good.[6] However, countries across the region are struggling to permit, regulate, and advance mining projects in the context of significant and growing community and civil society concerns about balancing the sector's negative impacts and benefits. This suggests a disconnect between good governance (and how it is measured and assessed) and good outcomes.

Specifically, investors in Latin America's mining sector—including those working to develop critical minerals projects—are increasingly running into opposition as they seek to advance projects, and governance issues are adding fuel to stakeholder objections to mining and driving conflict at the national political level and at the local level within mining-affected communities. The

key concerns fueling conflict are environmental impacts, insufficient consultation with affected communities, and inequitable distribution of socioeconomic benefits, as discussed in detail in the following sections.

2.1 Environmental Impacts

Latin America has seen a high degree of conflict around the environmental impacts of mining, particularly on water and biodiversity. Such impacts are already significant across the mining lifecycle, from exploration to production, and concerns are likely to grow, particularly over water pollution. Moreover, the mining of critical minerals, especially lithium, comes with high water requirements.[7] Countries across the region are already facing moderate to high degrees of water stress—meaning that more water users are competing for limited supplies—and climate change may intensify this.[8] The high-profile 2019 tailings dam disaster at Brumadinho, Brazil, which killed 270 people[9] and released 11.7 million cubic meters of waste downstream,[10] has also heightened communities' fears about the environmental impacts of mining.

Public and political concerns are putting legal and regulatory pressure on producing mines. Chile is a prominent example of this in the region. In April 2022, Chile's State Defense Council (*Consejo de Defensa del Estado*) sued BHP, Antofagasta, and Albemarle, alleging environmental damage in the northern Salar de Atacama salt flats.[11] Specifically, the state alleges that BHP's Escondida copper mine, Antofagasta's Zaldivar copper mine, and Albemarle's lithium operations overextracted groundwater from a key aquifer. The move follows the Chilean environmental regulator's March 2022 decision to fine Escondida US$8.2 million for damage caused by water extraction in the Salar de Atacama salt flat.[12] Companies operating in Chile are taking measures to reduce water use—increasingly relying on desalination, for example—but this alone is likely insufficient to reduce conflict.

Moreover, environmental concerns have halted or delayed multiple major late-stage development projects in recent years. Colombia's environmental authority shelved Minesa's environmental application for its Soto Norte gold project in October 2020[13] and AngloGold Ashanti's application for its Quebradona copper project in October 2021[14] following mass opposition to both projects, largely centered on concerns about impacts on water and biodiversity. Peru's former minister of economy and finance, Pedro Francke, described Southern Copper's long-delayed US$1.4 billion Tia Maria copper project as socially and politically unviable due to conflict around its perceived environmental impacts.[15] Communities feared that the mine would contaminate local waterways and soil and thereby threaten agricultural livelihoods.[16]

Concerns about environmental impacts are also increasingly affecting exploration projects and are therefore likely to affect long-term development pipelines. Ecuador's constitutional court revoked the environmental license and water permits held by state-owned mining company ENAMI EP for exploration of a protected forest in Los Cedros in the northwest part of the country. In its December 2021 ruling, the court found that mining activities in the forest violated the rights of nature (enshrined in the constitution) and found that the Ministry of Environment had failed to properly assess environmental impacts or adequately consult project-affected communities.[17]

This ruling is likely to have implications for other companies. In Chile, a court suspended Los Andes Copper's drilling program at its Vizcachitas copper project because vibrations from drilling allegedly disturbed the Viscacha rabbit.[18] In Argentina, the Chubut provincial government voted to allow some open-pit mining in December 2021 as an exception to a 2003 law banning open-pit mining and the use of cyanide. The exception—which would have paved the way for new exploration and the development of several major projects, including Pan American Silver's Navidad—was met with widespread protests, and the government ultimately reversed the decision.[19]

It is unclear how governments will balance new exploration and development with environmental protection moving forward. Stricter government regulations and their robust enforcement—particularly regarding the sector's water use—may ameliorate conflict to some extent. Some governments in the region appear to be moving toward tighter environmental regulation. Honduras recently banned all open-pit mining[20] (which is generally perceived to have greater environmental impacts than underground mining due to a larger physical footprint), while Mexico's environment ministry continues to block applications for new open-pit projects.[21] Court rulings in Colombia over the past several years[22] have restricted mining in areas deemed to be environmentally sensitive, such as high-altitude wetlands.

2.2 Insufficient Consultation with Affected Communities

The Indigenous and Tribal Peoples Convention 169 (ILO 169) establishes states' obligations to consult with Indigenous peoples on decisions that affect their land, communities, and rights. In the context of mining projects, this requires governments to relinquish power over key decisions to Indigenous populations if a project will impact their lands or rights—including decisions on whether or how the project should proceed.[23] The treaty has been widely ratified by states in Latin America, including Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Ecuador, Guatemala, Honduras, Mexico, Nicaragua, Paraguay, Peru, and Venezuela.[24]

However, there are considerable differences between the convention and how its requirement of free, prior, and informed consent (FPIC) has been legislated and put into practice across the region. First, it is unclear which populations the FPIC requirement applies to. International law recognizes self-identification as the key criterion for establishing indigeneity. However, governments are often motivated to keep eligibility criteria narrow to limit the populations to which the requirement applies.[25] Second, there is dispute among communities, governments, and civil society over whether FPIC processes require "consent," with governments and companies advocating for "good-faith consultation" that would allow a project to proceed even in the face of opposition from Indigenous peoples. Third, community and civil society trust in FPIC processes is generally low. The key materials used to inform these processes—such as environmental impact assessments—are often produced by project sponsors and are perceived by communities and civil society to be biased. Moreover, governments and companies have often used these processes as box-ticking exercises rather than as opportunities to subject projects to scrutiny and solicit meaningful input on their design. In this context, Indigenous communities often fear being coopted or used to legitimate projects that they do not support.

These discrepancies between the principles of FPIC and their implementation have led to conflict. In the past five years, disputes over insufficient consultation with affected communities have stalled multiple projects. For example, conflicts with Indigenous communities—largely over their allegations of insufficient consultation—halted the San Carlos Panantza copper project in Ecuador.[26] In June 2022, the Chilean Supreme Court voided two lithium contracts, ruling in favor of Indigenous communities that alleged the tender process violated ILO 169.[27]

While conflicts over FPIC are most likely to affect greenfield development, they can also affect producing mines. In 2018, Colombia's constitutional court ordered South32 to undertake retroactive consultation with Indigenous and Afro-Colombian communities at its Cerro Matoso nickel mine.[28] Mine expansions can also create flashpoints around consultation and consent. Communities have opposed an expansion project at MMG's controversial Las Bambas copper mine in Peru—which produces 2% of global copper supply—partly on the basis of not having been consulted.[29] Community leaders have pledged to take all necessary legal and social measures to halt the expansion.

Regulation related to FPIC is evolving across the region. Ecuador's constitutional court ruled in February 2022 that major extractive projects located in Indigenous territories and/or that could affect those communities' way of life could not proceed without their consent, giving them the right to veto projects.[30] However, disagreements have emerged over how the ruling should be applied. The industry insists that the ruling should not apply to projects that have already been greenlighted for development, while civil society and Indigenous groups argue that it should apply to all projects at all stages of development. The government is reportedly analyzing how to implement the ruling. In Chile, the constitutional convention process may strengthen the rights of Indigenous peoples. The constituent assembly, the body elected to draft the country's new constitution, voted in favor of an article requiring the state to obtain consent from Indigenous groups before approving any projects that could affect their rights.[31] In the medium to long term, stricter requirements may make greenfield projects more challenging to develop, but on balance they are likely to be a positive development for the sector.

2.3 Inequitable Distribution of Socioeconomic Benefits

Fiscal regimes are coming under fire for less-than-expected government financial take, evidence of tax avoidance mechanisms, and bumper shareholder returns and company profits in the absence of analogous benefits for communities. To address such conflict, stronger mechanisms are needed to ensure that governments receive an ample return on their resources, and that citizens (especially project-affected communities) realize socioeconomic benefits.

Changes to fiscal regimes are pending in several countries. Chilean President Gabriel Boric has signaled his intention to raise taxes on mines as part of a broader tax reform to fund increased social spending.[32] The Panamanian government renegotiated its contract with First Quantum for the Cobre Panama Mine, with the mining company accepting new terms in January 2022 in which it agreed to pay a minimum of US$375 million per year to the government and to end a tax holiday that allowed it to defer corporate tax until its investments at the mine were recovered.[33]

The Peruvian government is trying to amend the tax code after an attempt to increase taxes on the mining sector was voted down in the legislature, and in early April 2022 Economy and Finance Minister Oscar Graham said the government would target excess profits that companies have earned from price spikes.[34] Similarly, Brazil's lower house of congress is considering changes to the country's fiscal regime.[35] In an even more drastic move, Mexico has recently moved to nationalize its lithium sector.[36]

Even with changes to fiscal instruments to generate resource rents, a key remaining issue is how to manage resource revenues to distribute economic benefits effectively and equitably to local communities. Fiscal policy can be employed to increase the government's take and require a certain portion of resource revenues to be diverted to investment in social programs. However, effectively managing and spending these funds has often proved challenging, in part due to capacity gaps at the subnational level and weak public services.

In this context, communities are increasingly resorting to direct action to protest perceived insufficient economic benefits, which can disrupt production. This has had negative short-term impacts on the supply of critical minerals, notably copper. In Peru, the road used by MMG to transport product from its Las Bambas copper mine has been blocked on and off over the past year by aggrieved communities, which allege that the mine has not provided tangible socioeconomic benefits to improve quality of life in the community.[37] In late 2021, operations at the Antamina mine were suspended due to a roadblock set by community members, who alleged that the mine had not delivered on its commitment to support local socioeconomic development.[38] Communities have also blockaded Glencore's Antapaccay copper mine and Southern Copper's Cuajone mine in the past year.[39]

Additional government action is needed to address these issues. Specifically, changes to the fiscal regime must be accompanied by robust public investment programs so that revenues, once received, are invested in health systems, infrastructure, education, and other national development priorities. Moreover, changes should be accompanied by an analysis of the implementation, auditing, and inspection capabilities of authorities at both the national and local levels so communities can realize economic and development benefits from mining operations. Changes to fiscal regimes without these additional steps are unlikely to sufficiently address challenges related to the equitable distribution of socioeconomic benefits.

Government responses to concerns about environmental impacts, insufficient consultation with affected communities, and inequitable distribution of socioeconomic benefits will shape the extent to which the supply of critical minerals needed to service the energy transition will be smoothly provided.

3 Uncertainty About Future Demand

Demand trajectories for critical minerals will affect mineral development in Latin America. While demand will almost inevitably grow, it is uncertain by how much. Governments will need to remain flexible to avoid overinvestment that does not maximize benefits.

A May 2020 briefing by the Columbia Center on Sustainable Investment cautioned against overstating demand for critical minerals, noting that "projected development opportunities rest on bullish forecasts and uncertain terrain."[40] Demand trajectories are likely to be affected by several factors. In the following sections, we describe four key factors influencing demand trajectories: the pace of the energy transition, technological developments, improvements in recycling, and domestic mineral development in the European Union (EU) and United States.

3.1 The Pace of the Energy Transition

While it is uncertain what policies governments will implement to mitigate climate change, aggressive government action to limit global temperature increases would lead to higher demand for critical minerals. A demand boom for copper, lithium, nickel, and cobalt could lead to a more than fourfold increase in total mineral demand by 2040 under the International Energy Agency's Sustainable Development Scenario or a scenario in which outcomes targeted by the Paris Agreement are achieved and global temperature increases are limited to well below 2°C. Total consumption of lithium would rise most significantly by 2040, by an estimated 40 times. Demand for cobalt and nickel would rise by 20 to 25 times, while demand for copper would more than double.[41] By contrast, in the International Energy Agency's Stated Policies Scenario—based on existing national policies and commitments—demand would still increase but would only roughly double.

3.2 Technological Developments

A technological breakthrough in the coming years could reduce demand for some or all critical minerals. This would reshape the demand outlook, as forecasts are predicated on today's technology. For example, substantial research and development investment continues to be directed toward developing batteries that are lighter, more energy dense, and safer and require smaller quantities of minerals to produce.[42] Tesla CEO Elon Musk has long pledged to dramatically reduce cobalt content in the company's electric vehicle (EV) batteries due to ethical supply issues and cost considerations.[43] The company confirmed that half of the vehicles it produced in Q1 2022 used iron phosphate (LFP) batteries, which do not contain nickel or cobalt.* Ford is planning to use LFP batteries in some trucks sold under its IonBoost Pro brand,[44] while General Motors announced a low-cobalt battery in 2020.[45] Toyota has made significant investments in developing a commercially viable fluoride-ion battery,[46] which does not contain any lithium, while Volkswagen and Tesla have both expressed optimism about high-manganese batteries, which would contain no cobalt and reduced amounts of nickel.[47] If supply constraints create price volatility, that will further incentivize companies to reduce or find replacements for minerals in batteries and other key clean energy technologies.

3.3 Improvements in Recycling

Advancements in mineral recycling could reduce the need for greenfield development and could be a significant source of secondary supply. This could include recycling tailings from processing, scrap used in manufacturing, and scrap from end-of-life products. The EU is working to increase mineral recycling, with circular use of critical raw materials as a key component of its circular economy efforts.[48] A 2022 study published by the European Non-Ferrous Metals Association (*Eurometaux*) found that between 40% and 75% of Europe's critical minerals needs could be met through recycling if Brussels moves immediately to increase investment.[49] The rate at which recycling of minerals can be implemented at industrial levels could also affect the value and role of mining in the transition to electromobility.

* Tesla uses different variations of lithium-ion batteries in its EVs. The NCA battery uses nickel, cobalt, and aluminum in addition to lithium. The LFP battery uses iron and phosphate in addition to lithium. LFP batteries have a reduced range compared to NCA batteries because they cannot store as much energy per pound as lithium-ion batteries. However, they are much less expensive and last longer and are increasingly viewed by EV manufacturers as the battery of choice for lower-priced models. The NCA battery remains preferred for higher-end vehicles, which need to deliver both range and performance

3.4 Domestic Mineral Development in the EU and United States

Both the EU and the U.S. are working to develop domestic supplies of critical minerals to reduce imports and establish domestic supply chains. In March 2022, President Joe Biden authorized the Defense Production Act to increase battery metals production, namely lithium, nickel, cobalt, graphite, and manganese.[50] However, many critical minerals projects in the U.S.—including Lithium Americas' Thacker Pass project[51] and Antofagasta's Twin Metals copper project[52]—are stalled due to political, stakeholder, and regulatory challenges.[53] In May 2022, the U.S. Environmental Protection Agency banned the disposal of mining waste in Alaska's Bristol Bay watershed, which is likely the final nail in the coffin for the controversial proposed Pebble copper mine.[54] The extent to which Washington and Brussels are able to develop onshore critical minerals projects will affect levels of demand for minerals from other regions, including Latin America.

4 What Could the Future Look Like?

We have set out potential scenarios illustrating how dynamics around natural resource development could evolve over the next 10 to 20 years, considering conflicts over natural resource governance and uncertain demand for future-facing commodities. The scenarios include the extent to which countries could achieve the end goal of a well-regulated mining sector that increases public goods and spurs socioeconomic development with minimized social and environmental impacts. Figure 1 (on page 15) presents a high-level overview of the scenarios.

4.1 High vs. Low Conflict

The vertical axis considers the level of conflict around mining. A high level of conflict assumes inadequate or poorly enforced regulation and insufficient action to address concerns about environmental impacts, consultation with affected communities, and distribution of socioeconomic benefits. These issues would continue to drive disagreement among key stakeholders—including governments, communities, and civil society organizations—about how the sector should be governed and managed. Conflict is likely to manifest as intense politicization of the sector, high levels of litigation against mining companies initiated by civil society organizations and local communities, and regular asset-level blockades and protests that impede the development and operation of mining assets.

Conversely, a low level of conflict assumes significant improvements to current regulation to address the three governance issues, as well as a perception among key stakeholders that regulation is robust and adequately enforced. It would feature efficient dispute resolution through institutional mechanisms to resolve any conflicts that emerge. A low level of conflict would manifest as political consensus on how the sector should be governed and managed, generally high levels of trust in the sector, and only isolated incidents of blockades, protests, or litigation initiated by communities or civil society organizations.

The relationship between the three governance issues is complex, with some endogeneity and some independence. The scenarios assume some degree of correlation between government approaches to these issues. For example, if a government is prioritizing a robust public investment program to deliver socioeconomic benefits, it is also likely to be attentive to good regulations to manage impacts. In practice, however, government performance may vary in these three areas. In another example, a government could tighten regulation and enforcement to manage the environmental impacts of mining but fail to clarify and strengthen regulatory frameworks governing FPIC. In our view, governments need to meaningfully address each of the three issues to achieve a low-conflict scenario.

4.2 High vs. Low Demand

The horizontal axis considers demand for future-facing commodities. High demand assumes a substantial uptick in global demand for critical minerals. This would most likely be driven by a dramatic acceleration of the energy transition—likely aligned with the International Energy Agency's Net Zero by 2050 Scenario—and subsequent swift electrification of transportation, heat, and industry; significant expansion of solar and wind energy; and rapid growth in hydrogen use. A high-demand scenario is also more likely if no major technological breakthroughs or improvements occur in recycling.

Conversely, low overall demand could result from a combination of factors, including, for example, limited additional global action to mitigate climate change (e.g., along the lines of the International Energy Agency's Stated Policies Scenario) and limited technological breakthroughs in the next several years that reduce the quantity of new minerals needed for the transition, coupled with increased recycling rates.

It should be noted that different minerals may experience different demand trajectories in the coming decades, although this is beyond the scope of our analysis. This would, in turn, affect the dynamics of conflict. For example, a significant uptick in demand for lithium would present particular risks for environmental conflict driven by concerns about impacts on water quantity and quality.

FIGURE 1. Potential Scenarios for Critical Minerals Development*

* Our analysis is intended to illustrate a range of potential possibilities. The scenarios are therefore intentionally drawn starkly. Reality may fall somewhere in between or combine elements of different scenarios. While our intention is to broadly illustrate regional trajectories, it is of course possible that different jurisdictions within Latin America will end up on different paths.

SCENARIO 1:
Stranded Assets amid Conflict

1 Stranded assets amid conflict

High Conflict / Low Demand

- Investors are extremely selective given lower-than-anticipated demand
- Region viewed as high risk and uncompetitive; governments struggle to commercialize

Implications for resource governance

- Region may struggle to attract more responsible investors because listed multinationals are sensitive to risks
- Incentives for deregulation, with cash-strapped governments desperate to get projects over the line and salvage stranded assets

What would it look like?

In this scenario, mining development in Latin America would be stagnant, with markedly decreased capital flows into greenfield and brownfield development. Lack of government success in resolving persistent governance issues would lead to an array of blockades, protests, and litigation that halt project development and obstruct mining operations. After years of such conflict, governments would struggle to commercialize their mineral resources. Due to significantly lower-than-forecasted demand for most critical minerals and long-term price depressions, companies would be extremely selective in choosing where to invest and in prioritizing which assets to develop. Much of the region would be viewed as high risk and consequently unconducive to major investment.

How might it come about?

This scenario could come about if jurisdictions in Latin America are perceived as too risky or uncompetitive for investment in a context of low demand and low prices. It would be triggered if governments are unable or unwilling to resolve persistent governance issues.

What would it mean for resource governance?

This scenario would be negative for resource governance. Governments would struggle to regulate the sector, collect sufficient rents to increase public goods and spur socioeconomic development, and minimize social and environmental impacts. The combination of high conflict and low prices would create a high risk of "stranded" assets across the region as companies pull out of projects. In countries where mining contributes a significant percentage of GDP—such as Chile and Peru—this could have significant negative macroeconomic ramifications. Depending on how governments navigate these economic pressures, the scenario presents two key risks to quality governance.

First, the region could struggle to attract more responsible players in this scenario. Listed multinationals could be especially unwilling to assume the political, social, and reputational risks of developing projects and instead opt to pursue projects in "safer" jurisdictions or in selected frontier jurisdictions that are perceived to have more manageable risk profiles. This could spark an influx of less-responsible investment into Latin America's mining sector, with governments potentially seeking to compensate for lower levels of investment or salvage stranded assets through investments from, for example, Chinese or Russian companies, locally owned companies with less sensitivity to reputational risk, or junior companies aiming to flip assets. The result could be even worse social, environmental, and economic outcomes than those under the status quo dominated by Western firms.

Second, this scenario could create incentives for deregulation, with cash-strapped governments desperate to get projects over the line. Again, this could further undercut accountability, creating a vicious cycle in which governments are incentivized to lower social and environmental performance standards and sign on to skewed fiscal terms that do not deliver sufficient benefits to the state or to communities. Governments would have little incentive to shift decision-making power about individual projects or the sector to civil society organizations and local communities, including through processes such as FPIC.

SCENARIO 2:
A Scramble for Latin America

2 A scramble for Latin America

High Conflict / High Demand

- Governments have been unwilling or unable to address governance challenges
- Investment still pours into mining to fuel a rapid-fire global energy transition, significantly exacerbating conflict

Implications for resource governance

- Intense politicization of the sector, high levels of litigation, frequent blockades and protests, and confusion around environmental and social requirements
- Protracted conflict and confusion creates economic and political issues for governments

What would it look like?

In this scenario, conflict around mining in Latin America would persist amid skyrocketing demand for critical minerals. Investment would pour into mineral exploration activity and project development, with companies scrambling to access and develop new sources of minerals to fuel a rapid global energy transition. But fiscal regimes would be ill suited to enabling national and subnational government to capitalize on such a boom, and social and environmental regulatory regimes would remain weak overall and poorly enforced. Communities and civil society organizations would be intensely critical of mining development because of perceived disastrous social and environmental impacts and insufficient socioeconomic benefits. Stakeholders would routinely obstruct project development and halt operations at producing mines using a combination of litigation, protests, and blockades. Governments would struggle to effectively mediate these conflicts.

How might it come about?

This scenario could come about in several ways. Failure of governments to act in the short term could push the region onto this trajectory, especially if prices and demand continue to grow. Even many well-intentioned governments are already struggling to make fiscal changes and social and environmental reforms due to a combination of political polarization (making it difficult to advance reforms through legislatures) and competing priorities. For example, the administration of Pedro Castillo in Peru has not been able to advance fiscal reforms to hike taxes on the mining sector due to pushback from opposition parties.[55]

Even with robust action in the short term, the region could drift toward this scenario in the medium to longer term, particularly if governments come to view increased investment and social and environmental protections and/or higher tax rates as tradeoffs, giving priority to the former. For example, governments facing macroeconomic challenges (e.g., recession,

high inflation, stagnant growth, or unsustainably high debt) could focus more on maintaining competitive regulatory and fiscal regimes to capitalize on the critical minerals boom and be reluctant to make changes perceived to undermine competitiveness—or they could opt to take a lax approach to regulation, with weak enforcement of existing standards.

What would it mean for resource governance?

This scenario would present a pessimistic outlook for natural resource governance in the region. As in scenario 1, governments would face significant opposition to mining development and major challenges related to natural resource governance. Companies could be willing to tolerate higher levels of social conflict—and to advance projects amid intense stakeholder opposition—in a context of unprecedented levels of demand and commensurately high prices. The consequences would include the following:

- **Intense politicization of the mining sector.** Mining would likely be a hot-button political issue amid conflict and controversy, driving polarization and leading to broad opposition from environmentalist, leftist, and Indigenous parties. Right-wing parties, along with other powerful actors such as state-owned enterprises and investors, would be more likely to remain supportive of the sector, viewing mining as crucial to economic development and working to tip the scales in favor of investment. This lack of political consensus would make it exceedingly difficult to advance legislative reforms on key issues.
- **Significant levels of litigation involving companies and governments.** Civil society organizations and communities are increasingly resorting to litigation to hold companies accountable for environmental and human rights abuses in Latin America. In this scenario, the trend would likely accelerate. Ahead of the United Nations Climate Change Conference in late 2021, the Paris-based International Federation for Human Rights (*Fédération internationale des ligues des droits de l'homme*) and its member organizations launched the #SeeYouInCourt campaign, comprising coordinated legal actions targeting multinationals (mostly mining and oil and gas companies) that they alleged had violated the human right to live in a healthy environment.[56] The Chilean government's April 2022 decision to sue BHP, Antofagasta, and Albemarle over alleged environmental damage (mentioned earlier) may inspire other governments to take similar action against companies perceived to have violated environmental and social standards.
- **Confusion about social and environmental requirements.** In the context of high levels of litigation against companies, activist high courts could seek to protect communities' environmental and social rights with progressive rulings. This could create further uncertainty around social and environmental requirements if governments are unable to enshrine these rulings in clear legislation and regulation, particularly on key issues such as FPIC requirements and water use. This uncertainty could paradoxically exacerbate conflict by leaving companies confused about what is required and leaving communities and civil society dissatisfied with perceived gaps between statutory requirements and companies' performance.
- **Blockades and protests that halt development and operations.** Communities would likely more frequently halt project development and stall operations at producing mines using blockades and protests. These actions could serve as important negotiation levers in the absence of government action, allowing communities to negotiate for increased benefits.

An environment of protracted conflict and confusion would present a range of economic and political problems for governments. If projects are halted and mining operations are stalled on a frequent basis, this would undercut governments' ability to collect rents from the sector. Disruptions could also expose governments to arbitration risk, resulting in potentially costly judgments. Colombia, for example, has faced multiple arbitration claims from mining investors. Several of these have stemmed from constitutional court rulings that have designated areas as environmental protected zones (e.g., Eco Oro Minerals Corp. v. Republic of Colombia[57]), while others have stemmed from disputes over royalties (e.g., Glencore International A.G. and C.I. Prodeco S.A. v. Republic of Colombia[58] and South32 SA Investments Limited v. Republic of Colombia[59]). In a worst-case version of this scenario, protracted conflict around mining could undermine political stability. For example, Indigenous groups and political parties in Ecuador have mobilized against President Lasso, calling for mass protests and installing road blockades, and called for his impeachment.[60] A moratorium on mining in Indigenous territories is among the protesters' 10 demands, as well as more robust measures to mitigate social and environmental impacts and guarantees that projects will move ahead only when affected Indigenous communities have given consent.

SCENARIO 3:
Sustainable Development amid Booming Demand

3 Sustainable development amid booming demand

Low Conflict / High Demand

- Governments are well poised to capitalize on a critical minerals demand boom

Implications for resource governance

- Rigorous but clear social and environmental legislation backed by robust enforcement
- Fiscal regimes provide both the state and local communities with substantial economic benefits
- Overall high levels of transparency, accountability, and stakeholder participation around benefits and impacts

What would it look like?

In this scenario, governments would be well positioned to capitalize on a boom in demand for critical minerals, with well-regulated mining sectors across the region delivering meaningful economic benefits while providing social and environmental protections to minimize impacts. The sector would enjoy an overall high degree of public confidence, with relatively limited opposition from mining-affected communities and civil society organizations. This scenario would also be characterized by bipartisan political support and overall political consensus on how the sector should be governed and how resource rents should be managed and invested.

How might it come about?

For this scenario to come about, governments would need to make multifaceted reforms to social and environmental standards, fiscal regimes, and public spending. The reforms would need to comprehensively respond to concerns from civil society organizations and communities about natural resource governance in a way that these groups perceive as adequate and robust. Governments face a range of hurdles in bringing about this scenario,

including politics, the power of the private sector (which may oppose some of these reforms), and the general narrative that investment frameworks should be investor friendly. Key actors within government and the private sector would need to buy into and coalesce around these reforms, which would be a major shift.

What would it mean for natural resource governance?

This scenario would be positive for natural resource governance, and it would have two defining features. The first one is clear and robust social and environmental legislation backed by robust enforcement. In practical terms, this would mean regulation limiting the sector's impacts on freshwater—likely requiring or at least strongly incentivizing companies to build desalination plants and dramatically increase water recycling—and on biodiversity. Disclosure requirements would create a high degree of transparency about the sector's social and environmental impacts, while robust enforcement mechanisms would ensure that companies are held accountable for their performance. Stakeholder participation in governance of the sector would be high, with clear and broadly applicable consultation mechanisms that would allow project-affected communities to provide input into project design and benefits. This would include specific FPIC mechanisms for Indigenous communities, including consent provisions that give them the right to veto projects if the benefits are assessed as not outweighing the impacts on their territories or way of life.

The second defining feature of this scenario is fiscal regimes that provide both the state and local communities with substantial economic benefits. Crucially, this would include meaningful public investment programs to effectively spend revenues, including in key areas such as education, health care, and infrastructure. Governments would also likely set national strategic policies aimed at expanding economic activity to other stages of the supply chain to maximize the sector's value and thereby increase human capital and economic complexity across the region. This scenario would include a high degree of transparency about how mining revenues are spent nationally and subnationally, strong accountability mechanisms to ensure that revenues are managed effectively and sustainably, and some citizen participation in decision-making about spending.

SCENARIO 4:
A Premium Region for Investment

What would it look like?

In this scenario, Latin American countries would be considered premium jurisdictions for investment, with perceived low levels of political and stakeholder risk. Demand for critical minerals would be lower than

4 A premium region for investment

Low Conflict / Low Demand

- Governments able to monetize resources despite lower-than-anticipated demand and less mining activity globally due to perceived low levels of political and stakeholder risk

Implications for resource governance

- Smaller number of projects developed due to lower demand—but those that make it are less controversial
- Less in resource rents for governments due to lower prices and fewer operating mines, but well-designed fiscal regimes and robust public investment programs deliver benefit

in scenario 3. But governments would be able to monetize their mineral resources even with lower-than-anticipated demand and consequently less mining activity globally, attracting a solid amount of greenfield and brownfield investment. The sector would be well regulated, with strong social and environmental performance standards underpinned by clear legislation and significant, positive economic impact on governments and local communities. Public confidence in the sector and bipartisan political support would be high.

How might it come about?

As with scenario 3, this scenario would require government action to strengthen social and environmental standards and amend fiscal regimes to increase economic benefits to the state and local communities. This would have to be done in a balanced way that meaningfully responds to civil society and community concerns without eroding competitiveness. A lower-demand environment—and consequently a potentially slower pace of investment and development—could work to governments' advantage, giving them time and breathing room to advance changes. Moreover, less development could organically reduce conflict and reduce politicization, potentially making key legislative reforms more feasible.

What would it mean for natural resource governance?

As with scenario 3, this scenario would be broadly positive for natural resource governance and would include high levels of transparency, accountability, and participation. It would also be defined by rigorous and clear social and environmental legislation and fiscal regimes that provide both the state and local communities with substantial economic benefits.

However, this scenario differs from scenario 3 in several key ways. Crucially, a smaller number of projects would be developed due to lower demand. From a social and political perspective, this could be quite positive. The projects that would make it through the development process could be less controversial overall, with fewer perceived environmental and social impacts. Companies, especially listed multinationals, could be incentivized to put riskier or more controversial projects on ice rather than risk igniting high-profile opposition campaigns, particularly when this could have reputational ramifications. This could work to reduce overall levels of conflict. There is some precedent here. In 2016, Newmont put its controversial Conga copper and gold project in Peru on ice due to a confluence of market conditions and sociopolitical opposition.[61]

From an economic perspective, this scenario would be less positive but not catastrophic. Governments would collect less in resource rents due lower prices and fewer operating mines. However, well-designed fiscal regimes and a steady stream of investment would still make the sector an important contributor to GDP, while strategic development—including plans to develop value chains—would increase human capital and economic complexity, as in scenario 3.

5 Conclusion: Where Are We Headed?

A best-case scenario would see critical minerals driving a sustainable development boom in Latin America. Conversely, in a worst-case scenario, protracted conflict around mining could undermine political and economic stability. In high-demand scenarios, the ability of Latin America to provide critical minerals will also be more consequential for the global energy transition. Decisive action by companies and governments today would help shape the path forward.

Scenarios 3 and 4 are best-case scenarios for the future of mining in Latin America, with a well-regulated mining sector that increases public goods and spurs socioeconomic development with minimized social and environmental impacts. Governments would be able to meet demand with mineral development approaches that mitigate conflicts over natural resource governance and better serve citizen needs and priorities. This would also benefit the global energy transition—particularly in scenario 3, in which demand is high—by reducing the risks of supply disruptions and mitigating environmental, social, and governance impacts associated with developing the mineral resources needed for clean energy technologies.

Scenario 2 would likely be the worst-case scenario for the future of mining in Latin America. It presents the most risks to governments and companies, with the highest likelihood of protracted conflict around mining that produces substantial economic and political difficulties. This would undercut governments' ability to collect rents from the sector, increasing their exposure to arbitration risks and, in an extreme scenario, producing political instability. This would also hurt the global energy transition, undermining and disrupting supplies of critical minerals.

As things stand, scenarios 3 and 4 are somewhat unlikely, given the political and technical challenges involved in implementing more inclusive and broadly beneficial mineral governance. If governments cannot meaningfully address persistent conflicts over natural resource governance in the short term, these conflicts are likely to increase, particularly if demand for critical minerals surges in the coming years.

However, there are several things governments and companies can do to move toward one of these more positive scenarios.

While most **governments** across the region have pledged to improve the sustainability of their mining sectors, they need to be much more specific and granular about what this will look like. They must take concrete legislative steps to limit the impact of mining on the environment, expand and clarify mechanisms for consulting with affected communities, increase their own fiscal take, and establish good public investment programs that link the mining sector to broader

development goals. Ideally, governments should seek stakeholder input and participation where feasible and appropriate to inform legislative and regulatory decisions. Crucially, governments need to clearly communicate this suite of changes and their intended impacts to the public and ensure adequate resources for implementation and enforcement.

Companies can and should take concrete steps to reduce the risk of conflict over their assets in particular and the mining sector more broadly. They should aggressively focus on dramatically limiting their water use, even where this requires capital-intensive measures such as constructing desalination plants. They should commit to adhering to international social and environmental best practices across the board, even where this exceeds local statutory requirements. Regarding consultation, they should undertake good-faith prior consultation with all local communities—not just Indigenous communities—and integrate the feedback into project design and development. Companies should support fiscal reform efforts to increase the government share of resource rents. They also need to think critically and creatively about their own value distribution models, devising innovative ways to increase the socioeconomic benefits of their operations and enhance their impact, especially at the local level.

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References

1 Jamasmie, C. (2022, March 31). Miners need to invest over $100 billion to meet copper demand. *MINING.COM*. https://www.mining.com/miners-need-to-invest-over-100bn-to-meet-copper-demand/#:~:text=The%20world%20needs%20eight%20projects,in%20the%20next%20eight%20years

2 Cambero, F., & Sherwood, D. (2021, September 1). Chile needs $150bn to boost green copper output, minister says. *MINING.COM*. https://www.mining.com/web/chile-needs-150bn-to-boost-green-copper-output-minister-says/

3 BNAmericas. (2022, February 24). Spotlight: Peru looking to attract mining investors to US$53.7bn project portfolio. *MINING.COM*. https://www.bnamericas.com/en/features/spotlight-peru-looking-to-attract-mining-investors-to-us537bn-project-portfolio

4 Cohen, L. (2021, September 17). Ecuador expects 4 major mining projects to start up by 2025. *Reuters.* https://www.reuters.com/business/energy/ecuador-expects-4-major-mining-projects-start-up-by-2025-2021-09-17/

5 International Energy Agency. (2021). *The Role of Critical Minerals in Clean Energy Transitions*. https://www.iea.org/reports/the-role-of-critical-minerals-in-clean-energy-transitions

6 Natural Resource Governance Institute. (2021). 2021 Resource Governance Index. NRGI. https://resourcegovernance.org/sites/default/files/documents/2021_resource_governance_index.pdf

7 International Energy Agency. (2021). *The Role of Critical Minerals in Clean Energy Transitions*. https://www.iea.org/reports/the-role-of-critical-minerals-in-clean-energy-transitions

8 Reig, P., Gassert, F., Luo T., & Maddocks, A. (2013, December 12). *Water Stress by Country*. World Resources Institute. https://www.wri.org/data/water-stress-country

9 Phillips, D. (2020, January 21). Brazil prosecutors charge 16 people with murder in dam collapse that killed 270. *The Guardian*. https://www.theguardian.com/world/2020/jan/21/brazil-dam-collapse-mining-disaster-charges

10 Grebby, S., Sowter, A., Gluyas, J., et al. (2021) Advanced analysis of satellite data reveals ground deformation precursors to the Brumadinho Tailings Dam collapse. *Communications Earth & Environment* 2(2). https://doi.org/10.1038/s43247-020-00079-2

11 Cambero, F. (2022, April 8). Chilean State sues BHP, Antofagasta mines over Atacama water use. *Reuters*. https://www.reuters.com/business/energy/chilean-state-sues-bhp-antofagasta-mines-over-atacama-water-use-2022-04-08/

12 Cambero, F. (2022, March 10). Chile regulator fines BHP's Escondida mine for damage in Salar de Atacama. *Reuters*. https://www.reuters.com/world/americas/chile-regulator-fines-bhps-escondida-mine-damage-salar-de-atacama-2022-03-10/

13 Acosta, J.L., & Griffin, O. (2020, October 4). Colombia environmental authority shelves Soto Norte mine license application. *Reuters*. https://www.reuters.com/article/colombia-mining-idINKBN26P05J

14 Jamasmie, C. (2021, October 26). Colombian regulator shelves AngloGold's permit request for Quebradona. *MINING.COM*. https://www.mining.com/colombian-regulator-shelves-anglogolds-permit-request-for-quebradona/

15 Skidmore, Z. (2021, September 29). Tia Maria project a "no go" according to Peruvian finance minister. *Mining Technology*. https://www.mining-technology.com/news/tia-maria-no-go-finance-minister/

16 Mining Technology. (2019, November 28). Tia Maria: Peru's commodity versus community dilemma. *Mining Technology*. https://www.mining-technology.com/analysis/tia-maria-inside-the-commodity-versus-community-dilemma-in-peru/

17 Surma, K. (2021, December 3). Ecuador's High Court Affirms Constitutional Protections for the Rights of Nature in a Landmark Decision. *Inside Climate News*. https://insideclimatenews.org/news/03122021/ecuador-rights-of-nature/

18 Harris, P. (2022, March 28). Chile miners sanguine about change. *Mining Journal*. https://www.mining-journal.com/events-coverage/news/1429346/chile-miners-sanguine-about-change

19 Raszewski, E., & Geist, A. (2021, December 21). Pan America's Argentina silver mine back in limbo after mining law repealed. *Reuters*. https://www.reuters.com/markets/commodities/pan-americas-argentina-silver-mine-back-limbo-after-mining-law-repealed-2021-12-20/

20 France 24. (2022, March 1). Honduras bans open-pit mining. *France 24*. https://www.france24.com/en/live-news/20220301-honduras-bans-open-pit-mining

21 BNAmericas. (2022, February 27). 'Crazy' open pit ban seen as threat to Mexico mining industry. *BNAmericas*. https://www.bnamericas.com/en/analysis/crazy-open-pit-ban-seen-as-threat-to-mexico-mining-industry

22 Hill, D. (2016, February 21). Colombian court bans oil, gas and mining operations in paramos. *The Guardian*. https://www.theguardian.com/environment/andes-to-the-amazon/2016/feb/21/colombia-bans-oil-gas-mining-paramos

23 Columbia Center on Sustainable Investment. (2020, November 1). Free, prior and informed consent: Getting political to improve impact. *PLUS* POLITICS. https://ccsi.columbia.edu/sites/default/files/content/docs/publications/Eng-Brief-Free-prior-and-informed-consent-Getting-political-to-improve-impact.pdf

24 International Labour Organization (1991). Ratifications of C169 - Indigenous and Tribal Peoples Convention, 1989 (No. 169). *NORMLEX*. Retrieved June 28, 2022, from https://www.ilo.org/dyn/normlex/en/f?p=NORMLEXPUB:11300:0::NO::P11300_INSTRUMENT_ID:312314

25 Mebratu-Tsegaye, T., & Kazemi, L. (2020, October). Free, prior and informed consent: Addressing political realities to improve impact. Columbia Center on Sustainable Investment. *PLUS* POLITICS, https://ccsi.columbia.edu/sites/default/files/content/docs/publications/Eng-Report-Free-prior-and-informed-consent-Addressing-political-realities-to-improve-impact.pdf

26 Valencia, A., & Ellsworth, B. (2020, December 10). Strife with indigenous groups could derail Ecuador's drive to be a mining power. *Reuters*. https://www.reuters.com/article/ecuador-mining-focus/strife-with-indigenous-groups-could-derail-ecuadors-drive-to-be-a-mining-power-idUSKBN28K1TU

27 El Mostrador Cultura. (2022, June 1). Corte Suprema falla en favor de comunidades indígenas y deja sin efecto bases de licitación del litio en Atacama. *El Mostrador*. https://www.elmostrador.cl/cultura/2022/06/01/corte-suprema-falla-en-favor-de-comunidades-indigenas-y-deja-sin-efecto-bases-de-licitacion-del-litio-en-atacama/

28 Acosta, L.J., & Cobb, J.S., (2018, September 21). Colombia's Cerro Matoso mine wins appeal, will not pay damages. *Reuters*. https://www.reuters.com/article/us-colombia-mining-cerromatoso/colombias-cerro-matoso-mine-wins-appeal-will-not-pay-damages-idUSKCN1M102U

29 Aquino, M., Rochabrun, M., Grattan, S., & Pulice, C. (2022, March 25). Peru community plans opposition to Las Bambas mine expansion. *Reuters*. https://www.mining.com/web/peru-community-plans-opposition-to-las-bambas-mine-expansion/

30 Valencia, A., Griffin, O., & Cobb, J.S. (2022, April 1). With court's backing, Ecuador's indigenous block Amazon mining. *MINING.COM*. https://www.mining.com/web/with-courts-backing-ecuadors-indigenous-block-amazon-mining/

31 Jamasmie, C. (2022, February 23). Chile's new constitution may let indigenous groups veto projects. *MINING.COM*. https://www.mining.com/chiles-new-constitution-may-let-indigenous-veto-projects/

32 Villegas, A. (2022, June 16). Chile tax reform, mining royalty 'priority number one,' minister says. *Reuters*. https://www.reuters.com/world/americas/chile-tax-reform-mining-royalty-priority-number-one-minister-says-2022-06-16/

33 Jamasmie, C. (2022, February 16). First Quantum hopes for speedy Cobre Panama contract renewal. *MINING.COM*. https://www.mining.com/first-quantum-hopes-for-speedy-cobre-panama-contract-renewal/

34 Aquino, M. (2022, April 4). Peru targets copper price windfall in dialed-back tax reform, minister says. *Reuters*. https://www.reuters.com/world/americas/exclusive-peru-targets-copper-price-windfall-dialed-back-tax-reform-minister-2022-04-02/

35 Durao, M. (2022, March 25). Brazil Miners Fear 'Speculative Attack' in Electoral Year. *Bloomberg Tax*. https://news.bloombergtax.com/daily-tax-report-international/brazil-miners-fear-speculative-attack-in-electoral-year

36 Hernandez, V. (2022, May 16). Mexico Nationalises Its Lithium Industry. *International Banker*. https://internationalbanker.com/brokerage/mexico-nationalises-its-lithium-industry/

37 Rochabrun, M. (2022, March 2). Peruvian community blocks road used by MMG copper mine, source says. *Reuters*. https://www.reuters.com/world/americas/peruvian-community-blocks-road-used-by-mmg-copper-mine-source-says-2022-03-02/

38 Aquino, M. (2021, October 31). Antamina mine in Peru says halts operations due to protests. *Nasdaq* https://www.nasdaq.com/articles/antamina-mine-in-peru-says-halts-operations-due-to-protests-2021-10-31

39 Rochabrun, M. (2022, March 2). Peruvian community blocks road used by MMG copper mine, source says. *Reuters*. https://www.reuters.com/world/americas/peruvian-community-blocks-road-used-by-mmg-copper-mine-source-says-2022-03-02/

40 Toledano, P., Brauch, M.D., Kennedy, S., & Mann, H. (2020, May). Don't Throw Caution to the Wind: In the Green Energy Transition, Not All Critical Minerals Will Be Goldmines. Columbia Center on Sustainable Investment. https://ccsi.columbia.edu/content/dont-throw-caution-wind-green-energy-transition-not-all-critical-minerals-will-be-goldmines

41 International Energy Agency (2021). *The Role of Critical Minerals in Clean Energy Transitions*. https://www.iea.org/reports/the-role-of-critical-minerals-in-clean-energy-transitions

42 Bloch, C., Newcomb, J., Samhita, S., & Tyson, M. (2019). Breakthrough Batteries: Powering the Era of Clean Electrification. Rocky Mountain Institute. https://rmi.org/wp-content/uploads/2019/10/rmi_breakthrough_batteries.pdf

43 Sanderson, H. (2018, May 3). Tesla's cobalt decision could hit demand for the battery metal. *Financial Times*. https://www.ft.com/content/1c154770-4eb6-11e8-a7a9-37318e776bab

44 Ewing, J., & Lipton, E. (2022, March 07). Carmakers Race to Control Next-Generation Battery Technology. *The New York Times*. https://www.nytimes.com/2022/03/07/business/energy-environment/next-generation-auto-battery.html

45 Berman, B. (2020, March 5). GM says its new low-cobalt EV battery cell has 60% more capacity. *Electrek*. https://electrek.co/2020/03/05/gm-says-its-new-low-cobalt-ev-battery-cell-has-60-more-capacity/

46 Randall, C. (2020, April 14). Toyota's flouride ion battery with 1,000 km range. Electrive.com. https://www.electrive.com/2020/08/14/toyota-developing-flouride-ion-battery-with-1000-km-range/

47 Agatie, C. (2022, May 14). Manganese Could Be the Missing Link of Truly Affordable EV Batteries. *Autoevolution*. https://www.autoevolution.com/news/manganese-could-be-the-missing-link-of-truly-affordable-ev-batteries-188770.html

48 Gislev, M., & Grohol, M. (2018). Report on Critical Raw Materials and the Circular Economy. European Commission. https://weee4future.eitrawmaterials.eu/wp-content/uploads/2020/09/09_report-of-CRM-and-CE.pdf

49 Gregoir, L., & van Acker, K. (2022, April). Metals for Clean Energy: Pathways to solving Europe's raw materials challenge. KU Leuven & Eurometaux. https://eurometaux.eu/media/jmxf2qm0/metals-for-clean-energy.pdf

50 Newburger, E. (2022, March 31). Biden to invoke Defense Production Act for electric vehicle battery materials. *CNBC*. https://www.cnbc.com/2022/03/31/biden-to-invoke-defense-production-act-for-ev-battery-materials.html

51 Rothberg, D. (2022, February 3). Thacker Pass mine project remains in court battle amid rift in opposition. *The Nevada Independent*. https://thenevadaindependent.com/article/thacker-pass-mine-project-case-remains-in-court-battle-amid-rift-in-opposition

52 Scheyder, E. (2022, January 26). Biden administration kills Antofagasta's Minnesota copper project. *Reuters*. https://www.reuters.com/business/sustainable-business/biden-administration-kills-antofagastas-minnesota-copper-project-2022-01-26/#

53 Editorial Board. (2022, April 3). Critical Mineral Contradictions: Does Biden know that his own regulators are blocking mine projects? *The Wall Street Journal*. https://www.wsj.com/articles/critical-mineral-green-energy-climate-change-electric-cars-biden-mining-zinc-lithium-copper-china-pollution-endangered-species-defense-production-act-11648850666

54 Davenport, C. (2022, May 25). Biden Administration, Settling a Long Feud, Moves to Block a Mine in Alaska. *The New York Times*. https://www.nytimes.com/2022/05/25/climate/pebble-mine-alaska-epa.html

55 Aquino, M. (2021, December 17). Peru to insist on tax reform with new bills after legislative thumbs down, says minister. *Reuters*. https://www.reuters.com/markets/commodities/perus-congress-rejects-plan-hike-taxes-mining-sector-2021-12-17/

56 Fédération internationale des ligues des droits de l'homme. See You in Court. Retrieved on June 28, 2022, from https://seeyouincourt.fidh.org/?lang=en

57 Anonymous. (2021, December 20). Majority in Eco Oro v. Colombia finds violation of minimum standard of treatment, holds that a general environmental exception does not preclude obligation to pay compensation. *Investment Treaty News*. https://www.iisd.org/itn/en/2021/12/20/majority-in-eco-oro-v-colombia-finds-violation-of-minimum-standard-of-treatment-holds-that-a-general-environmental-exception-does-not-preclude-obligation-to-pay-compensation/

58 De Murard, S. (2019, December 17). Colombia is ordered to pay over USD 19 million for frustrating Glencore's legitimate expectations. *Investment Treaty News*. https://www.iisd.org/itn/en/2019/12/17/colombia-is-ordered-to-pay-over-usd-19-million-for-frustrating-glencores-legitimate-expectations-glencore-international-a-g-and-c-i-prodeco-s-a-v-republic-of-colombia-icsid-case-no-arb-16-6/

59 Griffin, O. (2020, March 31). Miner South32 files request for arbitration in Colombia royalty dispute. *Reuters*. https://www.reuters.com/article/us-south32-colombia/miner-south32-files-request-for-arbitration-in-colombia-royalty-dispute-idUSKBN21I33V

60 Valencia, A. (2022, June 22). Ecuador indigenous groups condition talks on pullback of security forces. *Reuters*. https://www.reuters.com/world/americas/ecuadors-military-vows-stop-protests-damaging-democracy-2022-06-21/

61 Jamasmie, C. (2016, April 18). Community opposition forces Newmont to abandon Conga project in Peru. *MINING.COM*. https://www.mining.com/community-opposition-forces-newmont-abandon-conga-project-peru/


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