Brazil Critical Minerals: Intelligence Report

Balancing Risk, Returns and Supply Chain Resilience

Original Intelligence Assessment | Challenger Research | 2026

> *Six risk dimensions. 16 mapped projects. OSINT, financial modelling and infrastructure analysis. For investors, offtakers and institutions making decisions in Brazil's critical minerals sector.*

Executive Summary

The Brazil Mineral Opportunities & Risks

Brazil is at the centre of one of the most significant strategic realignments in global commodity markets. As Western governments and institutional investors accelerate efforts to reduce dependence on Chinese-dominated critical minerals supply chains, Brazil has emerged as the most credible large-scale alternative. It holds approximately a fifth of global rare earth reserves alongside world-class deposits of niobium, graphite, lithium and nickel. It has a predominantly renewable energy grid, has attracted strategic financing from the US Development Finance Corporation, and has signed critical minerals agreements with the EU, India, Japan and Canada.

Yet in 2024, Brazil produced less than 1% of global rare earth supply. That gap between geological potential and production outputis the central intelligence finding of this report. It is not explained by geology. It is explained by the political economy of the country.

Brazil does not function like other mining jurisdictions. It is not primarily a geological play. It is a political economy play. Unlike jurisdictions where the quality of the rock is the primary determinant of asset value, in Brazil the primary drivers of valuation, cost of capital and project viability are regulatory stability, institutional integrity and the social licence to operate. The reserves are not in question. What determines whether those reserves translate into producing assets, bankable projects and returns on invested capital is the governance environment surrounding them.

~21% Global REE Reserves

Brazil holds approximately a fifth of global rare earth reserves — the most credible large-scale alternative to Chinese supply.

<1% of Global Supply

In 2024, Brazil produced just <1% of global rare earth supply. The gap is political economy, not geology.

6 Risk Dimensions

Geopolitical, regulatory, ESG, institutional integrity, financial, and infrastructure risk — all assessed in this report.

212 Conflict Events

In 2024, illegal mineral extraction drove 212 conflict occurrences across 18 Brazilian states.

The Queue Forming Around Brazil

Brazil has attracted a significant and growing queue of strategic partners seeking to secure critical minerals supply chains. The EU–Mercosur trade deal ratified in March 2026 will shape critical minerals trade terms going forward, with approximately 10% of Brazil's EU exports comprising minerals including iron ore. India's February 2026 critical minerals MoU is the most recent and most underreported partnership. The move positions India as an alternative refining destination, directly challenging the Chinese processing monopoly logic.

Partner	Date	Key Detail
EU / Mercosur	March 2026	Trade deal ratified. ~10% of Brazil's EU exports are minerals. Will shape critical minerals trade terms.
India	February 2026	Critical minerals MoU signed. Positions India as alternative refining destination, challenging Chinese processing monopoly.
Japan (JBIC)	March 2025	BNDES-JBIC MoU covers strategic sectors including mineral resources and sustainable energy.
Japan (JOGMEC)	November 2024	Minas Gerais renewed MoU with JOGMEC for minerals and energy security investment attraction.
Canada	August 2025	MoU under discussion with Natural Resources Canada. Non-binding but signals intent.
USA (Serra Verde Acquisition)	2026	USA Rare Earth announced a definitive agreement to acquire Serra Verde Group for approximately $2.8 billion, alongside a 15-year offtake agreement with a US-backed SPV

The World's Major Capital Blocs Are Converging on Brazil

The world's largest capital blocs have reached the same conclusion about Brazil. The direction of travel is consistent: Brazil is a jurisdiction that sophisticated capital is racing to enter.

The risks documented in this report are real. They have not disappeared. What has changed is the strategic premium that Western governments and institutions are now willing to pay to absorb those risks. Friend-shoring is essential in this new fragmented world. For investors, navigating the risks could yield decades of returns.

> *"The concept of friend-shoring has never been more relevant. In a context where mineral security goes beyond geology, Brazil presents itself as a friendly, democratic, and transparent nation, fully prepared to integrate reliably into global value chains."* — **Ana Paula Lima Vieira Bittencourt**, National Secretary of Geology, Mining and Mineral Transformation

The United States

On 20 April 2026, USA Rare Earth announced a definitive agreement to acquire Serra Verde Group for approximately $2.8 billion in cash and shares, explicitly to build a Western-aligned rare earth supply chain outside Asia. Serra Verde's Pela Ema operation in Goias is the only scaled producer outside Asia capable of supplying all four key magnetic rare earth elements at commercial volumes. The deal includes a 15-year, 100% offtake agreement, backed by a $1.6 billion US government funding package secured in January 2026.

This is not speculative capital. It is strategically committed, government-backed and structured for the long term. It also directly resolves the offtake-to-China problem documented in this research: USA Rare Earth's acquisition is built around a Western supply chain, not a Chinese one.

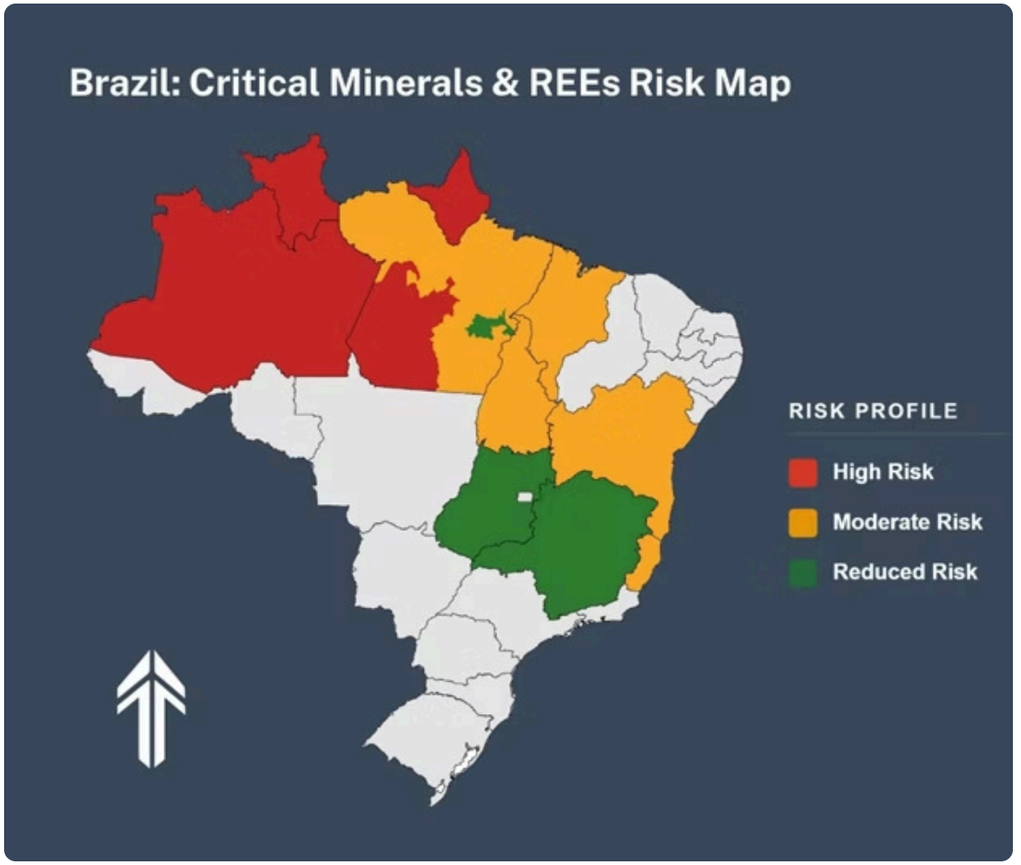
China

China is not standing still. In 2024, mining represented 13% of Chinese investment in Brazil, amounting to $556 million, as reported by the Brazil-China Business Council. Chinese capital has historically focused on acquiring existing operations and securing offtake rather than building new projects from scratch, a pattern designed to maintain downstream processing control regardless of where the ore originates. By 2024, China accounted for roughly 90% of global rare earth refining capacity and commanded dominant shares of graphite, manganese, lithium and cobalt processing. Brazil's government is aware of this dynamic and has made explicit that future access to Brazilian reserves requires investment in domestic processing, not simply offtake agreements for raw material exports.

Europe

At Hannover Messe 2026, where Brazil served as official country partner, President Lula and German Chancellor Friedrich Merz signed a bilateral cooperation declaration on critical minerals. The European Union is now formally reviewing four Brazilian critical mineral projects across rare earths, lithium and nickel. German development bank KfW issued a letter of intent to contribute €500 million to Brazil's Climate Change Fund operated by BNDES. The EU-Mercosur free trade agreement, entering provisional implementation from May 2026, eliminates tariffs on 95% of Mercosur goods entering Europe and restructures the tariff escalation regime that previously penalised value-added processing at source. For rare earth projects in Brazil targeting European offtake, this is a structurally significant shift in commercial conditions.

Brazil: Critical Minerals Risk Map



🔴 Red: High Risk

Amazonas, Roraima, Pará, Amapá. Illegal mining embedded. Enforcement near-absent. Categorically non-investable for EU-aligned sourcing.

🟡 Amber: Moderate Risk

Goiás, Tocantins, Bahia, Maranhão, Mato Grosso. Real project activity alongside structural governance constraints.

🟢 Green: Reduced Risk

Minas Gerais, São Paulo, southern states. Best institutional performance. Post-Brumadinho reforms effective. All zones carry project-specific risk.

**Classifications reflect assessed conditions in states with documented rare earth and critical minerals activity. Unclassified states fall outside the scope of this research.*

Infrastructure Risks

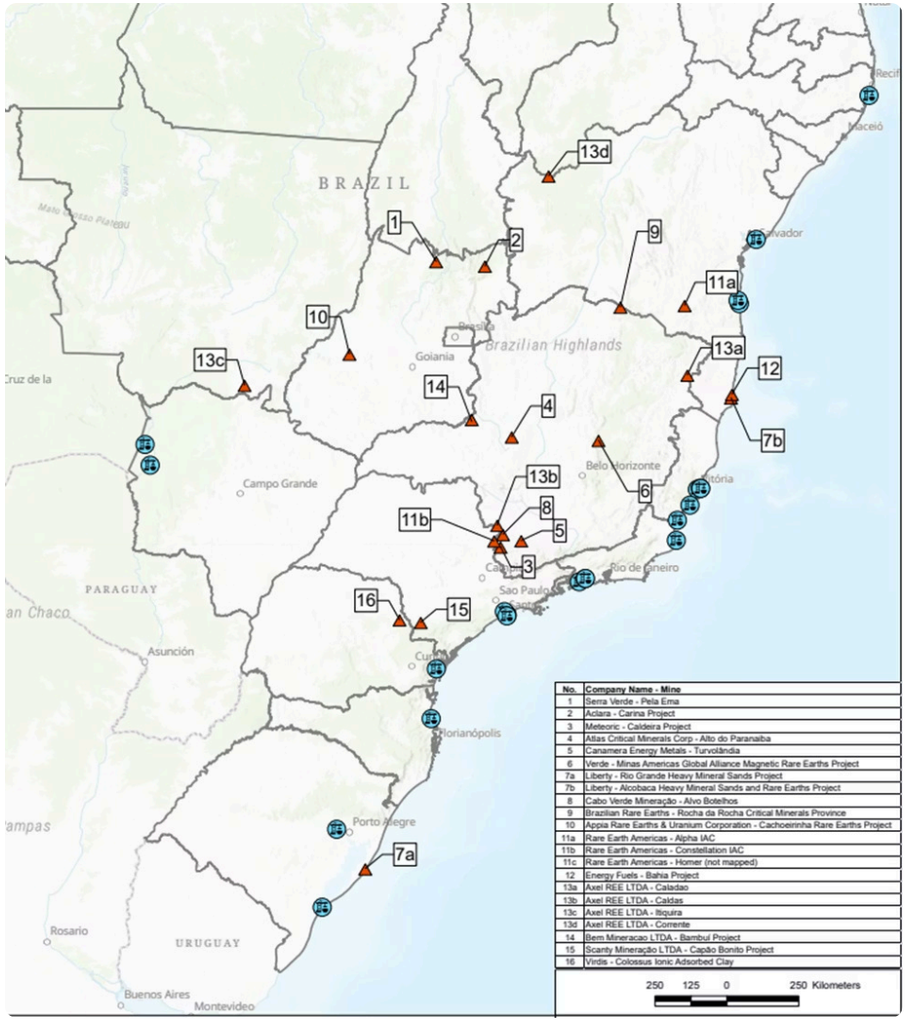
Port Facilities Relative to Rare Earth and Critical Minerals Project Locations, Brazil

The map plots Brazil's primary port facilities against the 16 project locations assessed in this research. The gap between where the projects concentrate and where export infrastructure exists is immediate. **Most Minas Gerais and Goias projects sit 300 to 600 kilometres inland from the nearest deepwater facilities.** Santos, Brazil's primary hub, lies approximately 600 kilometres from the Pocos de Caldas rare earth district.

The structural problem centres on infrastructure. In 2024, only 23% of Brazil's container shipments departed on time, with 55% of vessels at Santos facing congestion and some waiting up to 10 days to berth. National demand is projected to reach 15.2 million TEUs by 2028, surpassing current port capacity.

Rare earth concentrate exports would enter a system already at its limits, and one configured for agribusiness rather than specialist mineral cargo requiring separate handling and, in some cases, radioactivity monitoring.

Trucks carry **54% of Brazil's export output, with only 14% of roads paved**. Inland logistics from Minas Gerais to Santos run at approximately $90 per tonne, compounding the midstream discount.



Source: Geosyntec Consultants / Challenger Research Ltd.

Investment signals are improving. The Novo PAC programme has committed R$54.7 billion for new port leases, Santos is targeting a deeper navigation channel by 2026, and the FIOL railway connecting Ilheus to the national network would materially improve logistics for Bahia-corridor projects.

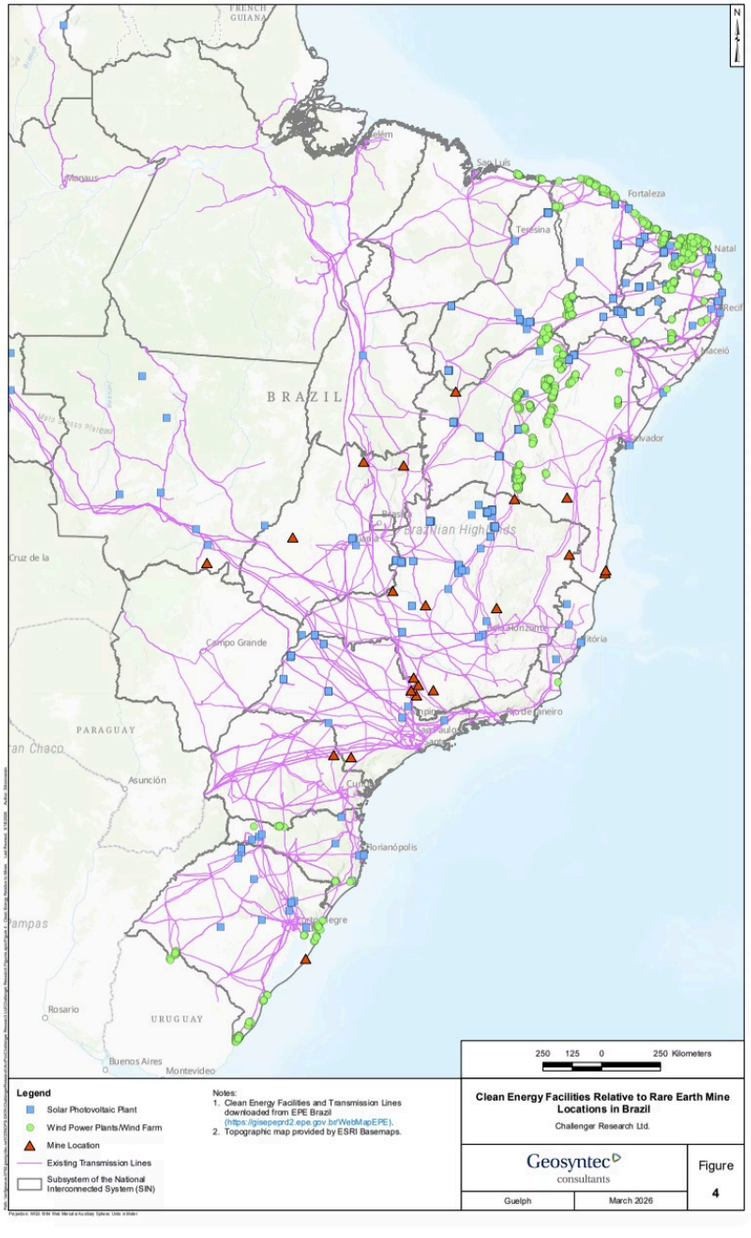
Clean Energy Relative to Mine Locations

Energy access for mine developers is more nuanced than the map suggests, and in several cases represents a material project risk.

The core structural problem visible on the map is that generation and transmission are decoupled. **Rapid renewable growth has exposed severe transmission bottlenecks**, with curtailment doubling year-on-year by mid-2025 to an estimated 20 terawatt-hours, solar being the most affected at around 27%. Most critically for this research, Bahia, where several frontier REE projects are advancing, is the worst-affected state for solar curtailment, surpassing 30%. A mine seeking a renewable PPA there is entering a market where generation exists but reliable transmission does not. Some developers bypass the grid through direct long-term PPAs with mining companies, but this requires scale and creditworthiness that most junior explorers lack.

Serra Verde's Pela Ema deposit in Goiás illustrates the best-case scenario: grid-connected, powered predominantly by renewable electricity, and located in an established mining district with developed infrastructure. For a project already connected to the National Interconnected System (SIN), this is a credible and marketable differentiator. **Most new projects in the pipeline cannot make the same claim.**

The government's transmission investment programme is substantial, with 2026 auctions targeting over **4,400km of new lines and more than R$25 billion in investment**, but the build-out timeline means projects targeting first production before 2028-2029 cannot treat this as a bankable assumption.



Source: Clean energy facilities and transmission lines derived from CPE Brazil. Topographic base map via ESRI Basemaps. Prepared by Geosyntec Consultants, March 2026.

Regulatory Risk: The Two-Track Problem and Its Compounding Consequences

Brazilian mining operates on two parallel and unsynchronised regulatory tracks. Track 1 (Mineral Rights) is managed by ANM, which grants exploration authorisations, processes Final Exploration Reports and issues mining concessions. Crucially, the final concession requires a ministerial signature, introducing direct political risk into construction approval. Track 2 (Environmental Licensing) is managed by IBAMA at federal level, issuing LP, LI and LO licences.

ANM will not issue the mining concession until the LI is granted, creating a hard dependency between the two tracks. When delays occur on one, they compound across the other. This is the mechanism by which routine regulatory delay becomes existential project risk.

Brazil's permitting timeline runs 36 to 84 months, volatile, compared to 12 to 18 months in Chile and 18 to 24 months in Australia. Brazil's unique veto risk, the MPF (autonomous prosecutors), has no comparable equivalent in peer jurisdictions.

The Stale Data Trap

A multi-year delay in ANM approving a Final Exploration Report can render the project's original Environmental Impact Study (EIA) stale. This gives the MPF procedural grounds to argue the data is outdated, forcing a restart of the 12-month biological survey clock. One delay creates another in a compounding cascade.

The Deregulate to Litigate Loop

Legislative attempts to accelerate mining (Law 15.190/2025) often trigger a defensive judicial response. When the executive branch attempts to bypass bottlenecks, it creates procedural flaws that lead to open-ended court-ordered delays. The reform intended to help becomes the mechanism for further paralysis.

Macro-Time Risk and Overlap

The longer a project sits in the ANM backlog, the higher its exposure to evolving legal doctrines such as the Marco Temporal (which determines whether indigenous peoples can claim lands not occupied in 1988). A project clean of indigenous claims at inception may become toxic by the time it reaches construction, due to shifts in STF jurisprudence during the delay.

⚠ From quantitative modelling: A 12-month production delay = estimated 15–20% hit to pre-tax NPV. A 24-month construction slip can inflate CAPEX by 20–30%. Care and maintenance costs run approximately $0.5–$1.5 million per month while awaiting licences. The Horizonte Minerals Araguaia case: cost-to-complete expanded from ~$537M to over $1B (87% increase), contributing to administration in 2024.

The ANM Capacity Crisis and the MPF Veto

ANM Structural Capacity Crisis

The ANM operates at approximately 30–40% of its authorised staffing level, with some primary sources citing vacancy rates as high as 60%. The result is a documented backlog exceeding 20,000 pending approvals. Routine title actions that should take months take years.

Operation Rejeito (2025) saw ANM and SGB directors arrested for involvement in schemes to forge environmental permits and facilitate illegal mining. This was a direct product of an agency severely under-resourced and poorly supervised. Such conditions often foster criminal activity, and therefore ANM & SGB staffing and operations should be monitored by investors.

MPF: Brazil's Fourth Branch

The Federal Public Prosecutor's Office (MPF) is the single most misunderstood risk in the Brazilian mining system for international investors, who confuse them as a regulator.

The MPF is an autonomous constitutional body with the power to bring Public Civil Actions that can suspend operating licences indefinitely, freeze project assets as precautionary measures, and force restart of environmental studies.

The Belo Sun / Volta Grande case illustrates how an installation licence can be frozen for years over the sufficiency of indigenous consultation studies. The October 2025 Federal Justice of Goiás ruling — suspending mining requests overlapping the Kalunga quilombo territory — is the most recent live example directly relevant to this research.

Regional Variation: Minas Gerais vs. Pará

The contrast between Minas Gerais and Pará represents the full spectrum of Brazilian mining governance — from the most viable to the most exposed jurisdiction in the database.The contrast between Minas Gerais and Pará represents the full spectrum of Brazilian mining governance — from the most viable to the most exposed jurisdiction in the database.

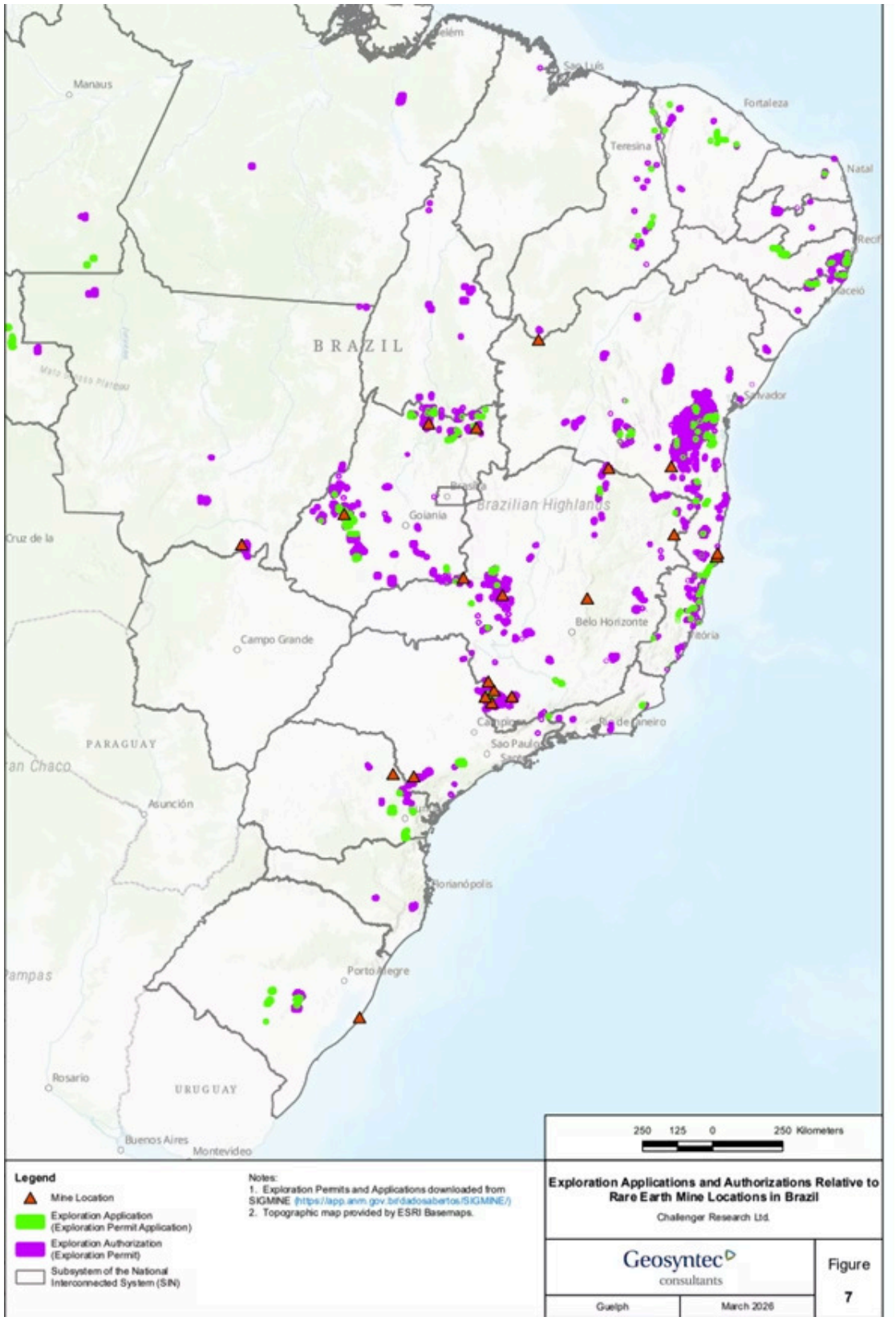
Governance Variable	Minas Gerais (Mature / Reformist)	Pará (Frontier / Amazon)
Permitting pathway	Deadline-driven; **concurrent** licensing (LAC); 12–24 months for strategic projects under Zema administration	Centralised (SEMAS); often 36–60 months; unpredictable due to IBAMA and FUNAI scrutiny
Primary regulatory risk	High technical standards for water and tailings ('Mar de Lama Nunca Mais')	High biome sensitivity and federal scrutiny; enforcement often used to compel community spending
Infrastructure / logistics	Dense but congested; ~$90/tonne trucking to ports (~600 km)	Logistics monopoly via Vale's EFC railway; risk of stranding junior companies without access
Fiscal posture	Pro-business under Governor Zema; reformist	TFRM levies (~R$15.05/tonne) to fund bioeconomy; punitive for juniors

Exploration Applications and Authorisations, Relative to Rare Earth Mine Locations

This map plots every active exploration application and granted exploration authorisation recorded in Brazil's national mining cadastre against the 16 primary rare earth and critical minerals projects assessed in this research. The concentration of permit activity across Minas Gerais and Goias reflects the core of Brazil's emerging rare earth pipeline, with secondary clusters visible across Bahia and the central-west corridor.

The volume of exploration activity signals genuine investor conviction in Brazil's geological potential. But that activity is being processed by an **ANM operating at approximately 30-40% of authorised staffing, with a documented backlog exceeding 20,000 pending approvals.** A significant proportion of the permits visible on this map are frozen in administrative limbo.

The projects that have already cleared preliminary environmental licensing, notably Colossus and Caldeira, are pulling ahead of a large cohort of assets that remain trapped in the backlog. That separation between the projects that are moving and those that are not is one of the most commercially significant distinctions in the Brazilian rare earth sector today, and it is not visible from geology alone.



Exploration Applications and Authorisations Relative to Rare Earth and Critical Minerals Project Locations, Brazil *Source: Geosyntec Consultants / Challenger Research Ltd, March 2026. Data: SIGMINE (ANM).*

Institutional Integrity Heatmap: Federal Agencies

The heatmap scores four dimensions for each institution: Capacity (staffing and resources), Autonomy (independence from political pressure), Enforcement Reliability, and Paper vs Practice Gap. Scores are taken directly from the Institutional Integrity Heatmap source file.

Institution	Capacity	Autonomy	Enforcement	Overall and Key Note
ANM	Low	Medium	Low	**HIGH RISK (9/10)**. Operating at 30–40% of authorised staffing. 20,000+ file backlog. Operation Rejeito (2025): directors arrested for forged permits.
IBAMA	Medium-Low	Medium-Low	Medium	**MEDIUM-HIGH (7/10)**. Recovering from budget cuts under previous administration. Susceptible to political swings.
FUNAI	Low	Low	Low	**HIGH RISK (9/10)**. Chronically under-resourced. Cannot enforce ILO 169 consultation obligations without federal force assistance.
ICMBio	Medium-Low	Medium-Low	Low	**HIGH RISK (8/10)**. Capacity weakened by budget cuts. Often unable to deter illegal mining in protected areas without IBAMA support.
MPF	Medium	Medium-High	Medium-High	**MEDIUM (4/10)**. Most autonomous and reliable veto player in the system. Not a regulator: a constitutional actor. Highest consequential power.

Institutional Integrity Heatmap: State-Level Governance

State	Capacity	Autonomy	Enforcement	Overall and Key Note
Minas Gerais	Medium	Medium	Medium	**MEDIUM (5/10).** Best-performing mining state institutionally. Post-Brumadinho reforms visible and effective. Most favourable jurisdiction for rare earth investment.
Bahia	Medium	Medium-Low	Medium	**MEDIUM-LOW (3/10).** Relative bright spot. Reasonable independence and stable performance. Relevant for BRE and Energy Fuels projects.
Mato Grosso	Medium-Low	Low	Medium-Low	**MEDIUM-HIGH (7/10).** Influenced by agribusiness and extractive interests. Enforcement improved but inconsistent. Large paper-versus-practice gap.
Amazonas	Medium-Low	Low	Medium-Low	**HIGH RISK (8/10).** Huge territory, grossly insufficient oversight. Enforcement extremely limited in remote forested areas.
Pará	Low	Low	Low	**HIGH RISK (9/10).** Enforcement near-absent relative to scale of illegal mining. Categorically non-investable for EU-aligned supply chains.
Roraima	Low	Low	Low	**HIGHEST RISK (10/10).** One of the highest-risk governance environments in Brazil. Enforcement virtually nonexistent. Persistent illegal mining including Yanomami crisis.

ESG and Compliance Risks

Brazil's ESG landscape is one of the most consequential and most misunderstood dimensions of the critical minerals investment case. EU due diligence frameworks have created binding legal obligations that extend deep into supply chains, and Brazil's enforcement reality creates structural exposure for any company that sources from this jurisdiction without independent verification. Brazil's regulatory framework looks robust on paper, but **the distance between what the law says and what is actually enforced is not visible from a desk review.**

The Structural EU Gap

The divide between regulation and enforcement reality is the most consequential finding for European investors and offtakers. Our compliance matrix assesses Brazil against three EU frameworks: CSDDD, CSRD and the EU Battery Regulation. The findings are structural, not incidental.

Environmental inspections cover less than 1% of active sites annually. In the 2019 to 2022 period, IBAMA used only 41% of its inspection budget. There is no mandatory human rights due diligence law. There is no digital chain-of-custody system.

The proposed Documento de Origem Mineral, which would provide mineral origin certification, is not yet law. Brazil's CVM sustainability reporting framework covers financial materiality only: the double materiality requirement of EU CSRD has no Brazilian legal equivalent.

A company relying solely on Brazilian regulatory compliance to satisfy CSDDD, CSRD or EU Battery Regulation obligations is operating on an assumption that our research does not support. The gap between what Brazilian law requires and what EU law demands cannot be closed through documentation alone. It requires independent, asset-level due diligence conducted against EU standards, not Brazilian ones.

The OECD's 2026 mapping of 21 due diligence legislative measures confirmed this fragmentation at the international level: companies operating across multiple EU frameworks simultaneously face divergent risk scoping requirements, different prioritisation criteria and conflicting disclosure obligations. **Brazil's structural compliance gaps sit inside a global regulatory landscape that is itself inconsistent.**

EU Framework Requirement	Risk Level	Brazil Reality
Mandatory human rights due diligence across supply chain	**HIGH**	No HRDD law. Inspections cover ~0.1% of active sites annually. No supplier monitoring obligation.
Mineral traceability and chain of custody	**HIGH**	No digital chain-of-custody system. Proposed DOM not yet law. Paper-based documents routinely falsified. At least 28% of Brazil's gold production showed signs of illegality.
Double materiality ESG reporting (CSRD)	**HIGH**	Brazil uses financial materiality only (ISSB/IFRS). Double materiality has no Brazilian legal equivalent.
Effective grievance mechanisms	**HIGH**	No legal requirement for mining companies to maintain grievance mechanisms. Communities rely on MPF and courts as backstop only.
Mineral passport (EU Battery Regulation)	**HIGH**	No mineral passport system. DOM proposed but not enacted.
Environmental remediation liability	LOW	Brazil has strong strict liability. Vale Brumadinho reparation totalled R$37.68 billion. Enforcement is slow but the obligation exists.

The Four Structural ESG Risks and CPT 2024 Conflict Data

875 total mining-related conflict occurrences in Brazil. Minas Gerais accounted for 308 cases (35.2% of national total) and 77% of total affected population (CPT 2024), the most conflict-intensive mining state by a wide margin. Critically, this conflict profile is predominantly linked to legacy iron ore operations (Vale, Anglo American, Samarco), not to rare earth ionic clay projects. This distinction is essential when presenting the research to investors who conflate the two.

Severe Enforcement Gaps

Brazil's regulatory system is split across federal and state bodies with chronic understaffing and inconsistent political backing. **Enforcement has historically covered less than 1% of active sites in some years.**

Illegal Mining and Criminal Infiltration

In 2024, **illegal mineral extraction was responsible for 212 conflict occurrences** (24.2% of all mining-related conflicts nationally) across 155 localities in 18 states. PCC presence is documented in mining zones.

Chronic FPIC Failures

Brazil has formal FPIC obligations under ILO 169 but implementation is frequently superficial or bypassed. Projects without independently verified FPIC face acute legal, operational and reputational risk under EU due diligence rules.

Traceability Gaps

94% of gold exported from Brazil to Europe in 2022 originated from regions with high illegal mining risk. Brazil lacks a unified chain-of-custody system. EU compliance is not achievable through documentation alone.

ESG Risk Is Not Separate From Financial Risk. It Drives It.

Every bubble on this chart is a project scenario. The colour is the cost of capital. The position is the outcome. Together they tell a story that no amount of qualitative ESG reporting can replicate: when ESG exposure rises, the cost of capital rises with it, and when the cost of capital rises far enough, the project stops being worth anything at all.

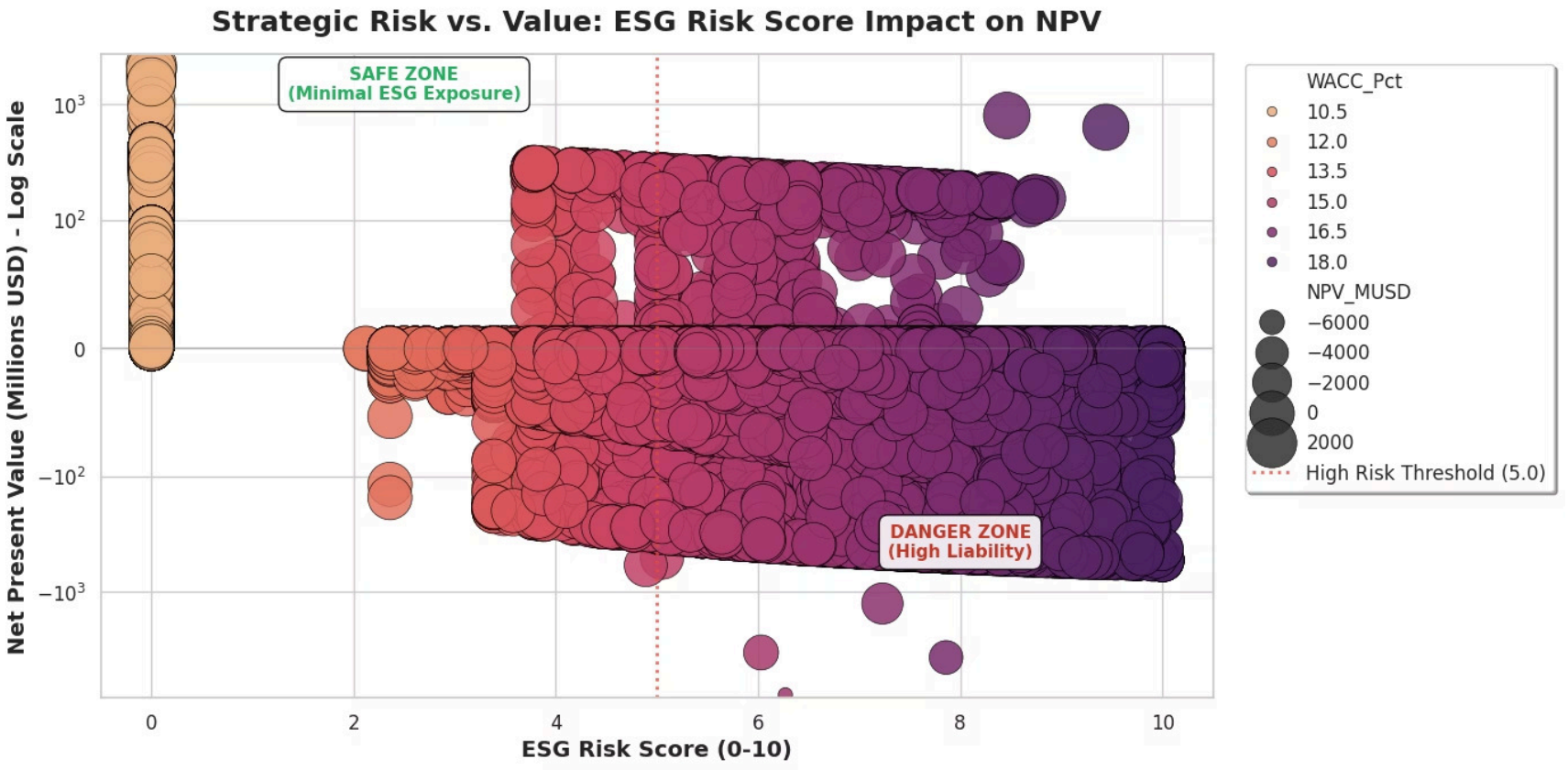
Projects with low ESG exposure, shown in orange on the left, carry a WACC of approximately 10.5% and cluster above zero NPV. They are financially viable. Projects with high ESG exposure, shown in deep purple on the right, carry a WACC of 16.5% to 18% and sit overwhelmingly below zero. The returns have been destroyed not by commodity price movements, not by geological disappointment, but by the compounding financial penalty of ESG risk left unmanaged.

Ths is a cliff edge, not a gradual slope. The colour shift from red to deep purple happens almost immediately at that boundary, which means the market is pricing the ESG risk premium sharply and without mercy at precisely the point where it becomes material.

The dotted line at ESG risk score 5 is the threshold that matters. Cross it and two things happen simultaneously: the cost of capital jumps and NPV turns negative for the vast majority of scenarios.

A failed FPIC process, a supply chain traceability gap, a community conflict that triggers MPF intervention: any of these can move a project from the left side of that line to the right. The geology does not change. The reserve does not shrink. But the financial model breaks.

This chart was produced from Challenger Research's proprietary financial modelling of Brazilian rare earth and critical minerals projects. It is not a theoretical framework. It is a quantitative stress test of real project scenarios in this jurisdiction, under real regulatory and ESG conditions. For any investor, offtaker or institution operating under EU due diligence frameworks, it should be read as a direct financial argument for independent ESG intelligence. The cost of getting it wrong is not reputational. It is structural.

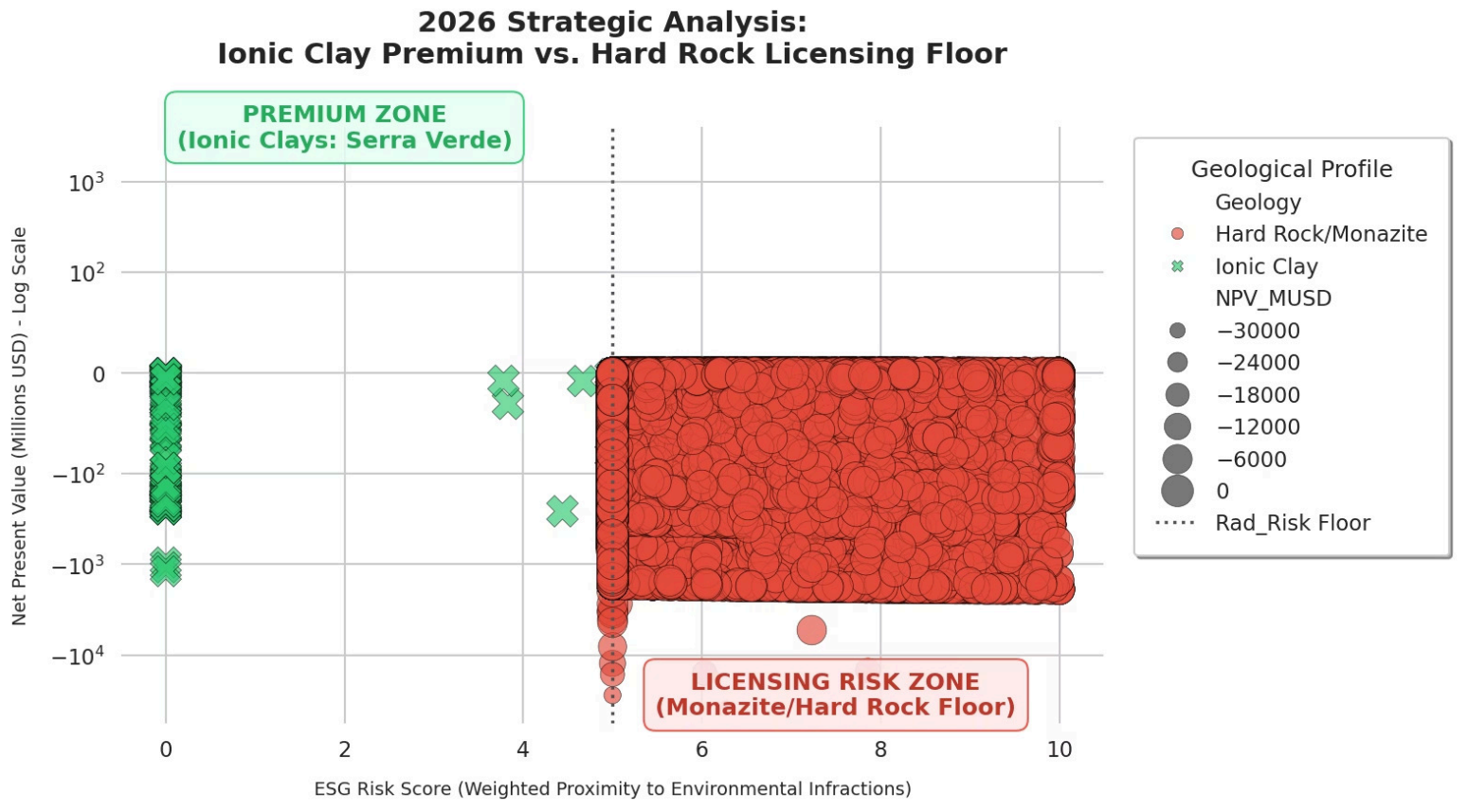


Financial modelling: Challenger Research

Ionic Clay vs Hard Rock: The 260bps Difference

Our financial modelling quantifies the value of ESG performance on project economics. The chart illustrating this analysis plots ionic clay rare earth deposits as green crosses clustered in the premium zone at low ESG risk scores, carrying a risk-adjusted WACC (Weighted Average Cost of Capital) of approximately **11.6%**. Hard rock and monazite deposits are shown as red circles collapsed into the licensing risk zone at ESG risk scores above 5, carrying a WACC of approximately **14.2%**.

That differential of approximately **260 basis points** is the financial transmission mechanism by which deposit type converts into cost of capital, and cost of capital converts into NPV. A project on the wrong side of that line does not simply face higher financing costs. At approximately 45–60 days of operational shutdown per year, it becomes NPV-negative. The ionic clay equivalent remains NPV-positive at up to 90 or more days of disruption annually.



BNDES financing functions as a geopolitical discount signal. Sigma Lithium's BRL 487 million, 16-year BNDES commitment at 7.45% (versus a sovereign rate of 10.5%) illustrates the size of this discount. Sustainability-linked loan pricing grids can step the interest rate margin up by 25 basis points per KPI failure, directly impacting cash flows.

260bp

WACC Differential

Ionic clay (~11.6%) vs. hard rock (~14.2%) — the financial cost of deposit type and ESG risk profile.

90+

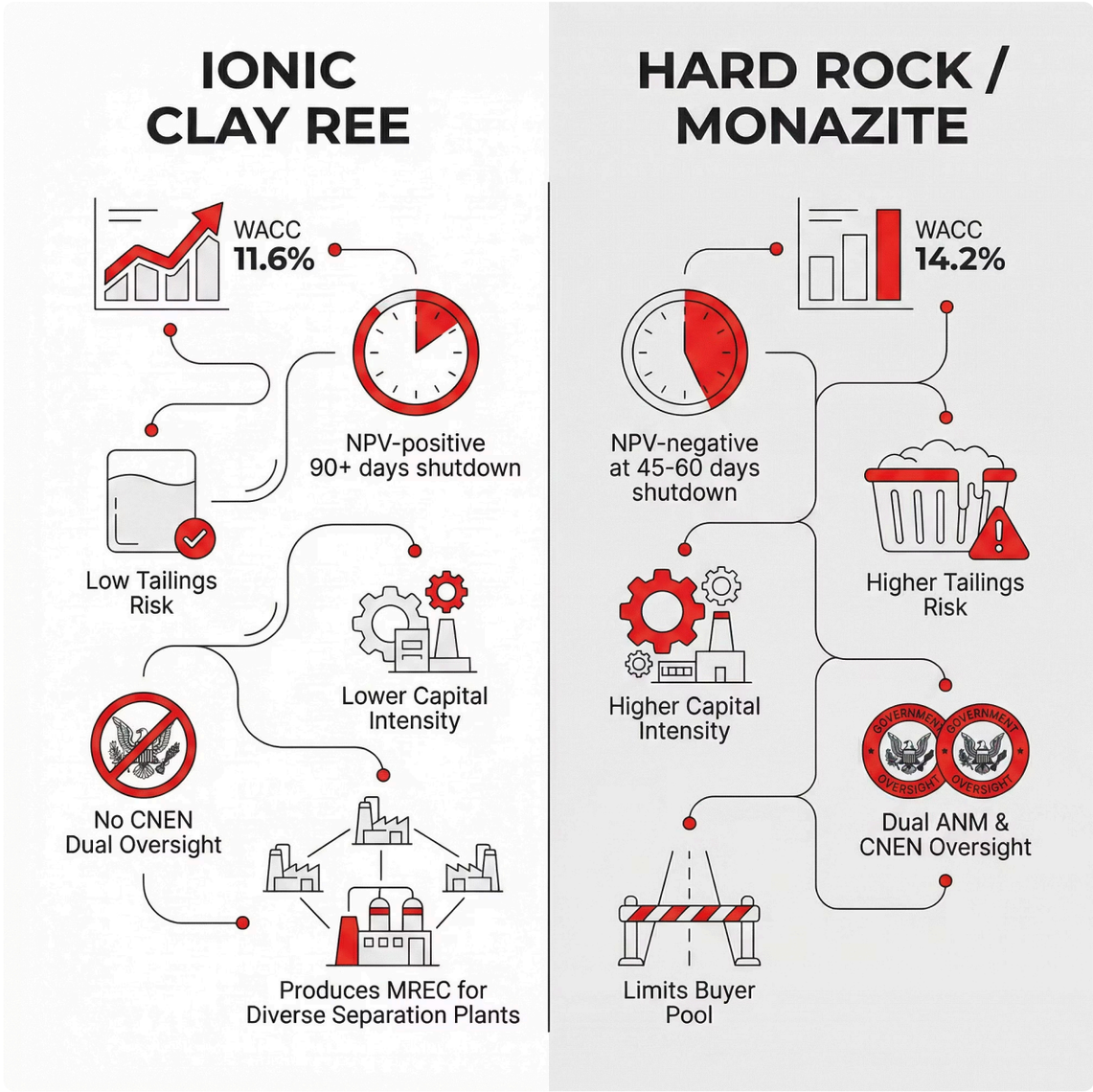
Days Shutdown Tolerance

Ionic clay projects remain NPV-positive at 90+ days of annual operational shutdown.

90%

ESG Commitment Growth

ESG commitments in Brazil have risen 90% since 2020.



Live OSINT Developments

1 2025: ANM 'User Guide' Mechanism Abuse

Mining companies used the ANM's user guide (Guia de Utilização) mechanism, intended for limited provisional extraction, to commence exploration without prior IBAMA environmental approval. The Federal Court of Auditors ruled such concessions illegal in mid-2024 but enforcement remains inconsistent. This loophole presents a directly analogous risk profile for rare earth claims.

2 October 2025: Federal Justice of Goiás

Suspended mining requests overlapping the Kalunga quilombo territory, including rare earth claims, citing absence of free, prior and informed consent under ILO Convention 169. The order also nullified existing ANM licences within the quilombo zone. The most current and directly relevant judicial development for the rare earth sector.

3 November 2025: Appia / Ultra Rare Earth

Ultra Rare Earth Inc. acquired a 50% stake in Appia's Cachoeirinha project (Goiás) for $6 million, signalling continued investor appetite for ionic clay assets in the amber zone despite governance constraints.

4 January 2026: Vale, Congonhas, Minas Gerais

Two sludge and water spills within 24 hours released over 260,000 cubic metres of mining waste. Affected the Maranhão River and tributaries. No injuries reported but significant environmental harm. Reinforces the ongoing legacy risk of hard rock iron ore operations in the state.

Twenty Years of Expansion: What the Satellite Record Shows

These four images show the same site near Nova Iguacu, Goias, captured across a 21-year period from 2004 to 2025. In the first frame, the land is predominantly agricultural. By the final frame, a large-scale open pit and tailings storage complex has replaced it entirely, with visible water accumulation in the impoundment structures and progressive clearance of the surrounding vegetation.

This time series is part of Challenger Research's OSINT satellite imagery analysis covers mine expansion across Minas Gerais and Goias from 2004 to 2025. It documents not just that mining has expanded, but how it has expanded: the rate of land use change, the growth of tailings infrastructure, and the relationship between the operational footprint and surrounding agricultural and community land.

For investors and companies operating under EU due diligence frameworks, this type of satellite evidence is directly relevant.

The CSDDD and EU Battery Regulation require companies to identify and assess **environmental impacts across their supply chains**. Satellite time series of this kind provide the most objective available evidence of land use change, tailings risk and the physical footprint of operations over time. They cannot be disputed on the basis of corporate self-reporting. They show what happened, not what was declared.

The Nova Iguacu series sits alongside a companion time series documenting tailings storage expansion south of Barro Alto, Goias, across the same period. Together they represent some of the most analytically significant visuals in this research.

Satellite imagery analysis: Challenger Research. Nova Iguacu, Goias, 2004-2025.

The Broader Pipeline: Assessed Projects

The Challenger Research database tracks over 40 named entities with rare earth activity in Brazil, plus more than 100 additional licence holders identified through SIGMINE data. Of these, 16 projects have been fully profiled with coordinates, geology, investor detail, infrastructure access and status assessment. The six further assets below illustrate the geographic and geological breadth of the pipeline beyond the three ionic clay leaders, from hard rock monazite in Bahia to ionic clay carbonatite systems in Goias, with institutional shareholders including BlackRock, Vanguard and Piedmont Lithium already positioned.

1 Aclara / Carina (Goiás)

236.3 Mt indicated, 48 Mt inferred, 165.4 Mt probable reserve. Pre-feasibility completed October 2025. Covers 15 REEs including heavy REEs. DFC invested $5M. Planned investments up to R$2.8 billion. Production timeline: ~2030.

2 Rare Earth Americas / Constellation IAC (MG)

266.2 Mt measured and indicated at 2,637 ppm TREO. Ionic clay, tropical weathering profile in alkaline intrusive complex. Access to low-cost hydroelectric power. 320 km by road to Port of Santos.

3 Brazilian Rare Earths / Rocha da Rocha (Bahia)

1 million acres of exploration ground. Sampling returned exceptional grades: in excess of 45% TREO in hard rock and 11% TREO in shallow monazite sands. Hard rock / monazite type — tailings risk applies. Institutional shareholders include BlackRock, Vanguard, Franklin Advisers.

4 Rare Earth Americas / Alpha IAC (Bahia)

1.2 billion tonnes at 1,100 ppm TREO (indicated and inferred). 1,080 drill holes completed. Launched with $16M from private investors including Piedmont Lithium. Received further $15M in early 2026. Ionic clay. Advanced exploration and evaluation stage as of 2026.

5 Appia Rare Earths / Cachoeirinha (Goiás)

6.6 Mt indicated at 2,513 ppm TREO and 46.2 Mt inferred at 2,888 ppm TREO (NI 43-101 compliant). Alkaline intrusive complex; REE mineralisation in both ionic clay and carbonatite zones. Also contains niobium and scandium. 50% stake acquired by Ultra Rare Earth Inc. ($6M) in November 2025.

6 Energy Fuels / Bahia Project

Acquired 2023. 17 mining concessions over 15,000 hectares. Nd, Pr, Dy, Tb. Placer mineral sand deposit: monazite, ilmenite, zircon. Hard rock / monazite type — tailings risk applies. Highway BA001; Port of Ilheus (320 km north) or Port of Vitoria (300 km south).

Conclusion: Where the Risk Is Concentrated

Brazil's geological endowment is exceptional. The strategic partnerships are real and multiplying. The government's ambition is genuine. Western capital, from Washington to Brussels to Tokyo, has made its position clear.

But ambition and execution are not the same thing. The institutional infrastructure required to convert Brazil's reserves into producing assets is not keeping pace with the opportunity.

The regulatory backlog, the ESG enforcement gap, the midstream chokepoint and the governance constraints documented in this research are not reasons to stay out. They are the reasons that independent intelligence matters.

The gap between what Brazil could be and what it currently delivers is precisely where investment risk concentrates. It is also where the right position, built on the right analysis, generates the most durable returns.

Deposit Type Is Decisive

Ionic clay assets carry a ~11.6% WACC, remain NPV-positive at 90+ days of annual disruption, and face a simplified regulatory pathway. Hard rock assets carry ~14.2% WACC and turn NPV-negative at 45–60 days. This is the most commercially useful finding in the dataset.

ESG Is a WACC Management Strategy

Independent, asset-level ESG intelligence is not a reporting exercise. It is a commercial necessity for any firm operating under CSDDD, CSRD or the EU Battery Regulation. Brazilian regulatory compliance alone cannot satisfy EU obligations.

The Processing Gap Is the Opportunity

The supply chain problem is not extraction — it is processing. Projects that can demonstrate non-Chinese refining pathway partnerships will command premium valuations and preferential financing. This is where long-term value will be captured.

Time-to-Market Drives NPV

In Brazil, time-to-market is a more significant determinant of NPV than commodity price volatility. A 12-month delay = 15–20% NPV hit. A 24-month construction slip = 20–30% CAPEX inflation. Schedule risk must be modelled explicitly.

Financial modelling: Challenger Research. NPV stress test, shutdown scenario analysis, WACC bridge and Monte Carlo simulation are all Challenger Research original work. Maps and mine location data: Geosyntec Consultants / Challenger Research Ltd, March 2026. OECD regulatory fragmentation mapping: OECD (2026), No. 101, reproduced under CC BY 4.0.

Our Service Suite

Four principal service lines, available individually or as a tailored package.

1

Specialist OSINT Investigations

Targeted supply chain & procurement investigations using our proprietary methodology - including satellite imagery, trade data, procurement records, and network analysis for Satellite & Geospatial verification and ESG verification.

2

Geopolitical & Regulatory Risk Assessment

Geopolitical and regulatory analysis assessing political risk trajectories, sanctions exposure, and evolving regulatory frameworks.

3

Integrated Risk Intelligence

Deep dive research encompassing our OSINT, geopolitical and regulatory capabilities.

4

Conviction Testing

Every investment team develops blind spots. We provide an independent expert challenge to your core investment theses, drawing on geopolitical analysts, policy specialists, and other key experts.

Ready to Work With Us?

Whether you are an investor seeking independent intelligence, an institution navigating regulatory complexity, or an organisation requiring bespoke strategic analysis, Challenger Research is ready to discuss how we can support your objectives.

🌐 **challengerresearch.com**

✉️ **edward@challengerresearchgroup.com**