



LITHIUM IN BRAZIL



Where is Brazil's lithium?

MINAS GERAIS

Production is concentrated in the Jequitinhonha Valley, in Minas Gerais

A world-class **pegmatite province** covering **17 municipalities**

(Araçuaí, Itinga, Coronel Murta and others, **~200 km**).

There is also long-standing production by **AMG Minerais Críticos** in **Nazareno (Minas Gerais)** and exploration in **Bahia** and **Paraíba**.



THE REFINING BOTTLENECK

CBL is the only company with chemical processing (carbonate and hydroxide), on a small scale; the **rest leaves the country as concentrate**.



Brazil stays at the lowest-value stage of the battery chain.

UNITS

Tonnes of concentrate (spodumene, 5.5–6% Li₂O) are **not equivalent** to contained lithium or to LCE (lithium carbonate equivalent);

That is why figures in the **hundreds of thousands** (concentrate) and in the **tens of thousands** (LCE) coexist for the same year.

RESERVES

In the world ranking, **Brazil comes 7th in reserves**, with **540,000 t of contained lithium**, in the USGS Mineral Commodity Summaries 2026. The SGB considers the country's potential underestimated.

• The ANM, Brazil's mining agency, and the Geological Survey of Brazil (SGB) report reserves of **642,500 t of Li₂O, concentrated** in the Eastern Brazilian Pegmatite Province and in the São João del-Rei province, both in Minas Gerais (Sumário Mineral 2025, base year 2024).

PRODUCTION



In 2024 Brazil produced **944,100 t of spodumene concentrate** at an average grade of 5.7%, equivalent to **25,979 t of contained Li₂O** — up 71% on 2023 (ANM, Sumário Mineral 2025).

Measured as **contained lithium metal**, the unit used by the USGS, output was **10,200 t in 2024** and an estimated **12,000 t in 2025**.

About 4% of world production

Almost all of it in Minas Gerais

The three figures describe the same output in different units.

Investment in lithium exploration reached **US\$ 25.3 million in 2024**, **79.4%** of it in **Minas Gerais** (SGB).

EXPORTS



In 2024 **exports totalled US\$ 302.6 million**, down 39.5% on 2023, with 97% of the value going to China, followed by the United States (0.5%) and Germany (0.4%), according to the ANM.

• **The fall came from prices:** exported spodumene concentrate dropped 60%, from US\$ 2,105.37/t FOB in 2023 to US\$ 827.60/t in 2024 (SGB).

PROJECTIONS

Government and market talk of up to 100,000 t of LCE a year by 2030 and more than US\$ 5 billion in capex, but no official document projects that volume. What does exist is the pipeline listed by the SGB:

• **Colina (PLS)** with 499,000 t/year of concentrate at 5.2% Li₂O in a preliminary economic assessment.

• **Bandeira (Lithium Ionic)** with 178,000 t/year and a 14-year mine life; Neves (Atlas), with 150,000 t/year in phase 1 and up to 300,000 t/year in phase 2.

• **AMG** moving from 90,000 to 130,000 t/year; plus **Sigma's expansion**

All depend on prices, permits and execution.

MARKET DATA

COMPANIES AND MAIN SHAREHOLDERS

COMPANY (listing)	MAIN ASSET	CONTROL/ MAIN SHAREHOLDERS	STATUS (mid-2026)
Sigma Lithium <i>Nasdaq/TSX-V: SGML</i>	Grota do Cirilo complex • Itinga/Araçuaí (MG)	A10 Investimentos, largest shareholder; BlackRock among the investors	Capacidade nominal de 330 mil t/ano (fase 1 declarada em 270 mil t) , expansion to 520,000 t in 2027; the Feam embargo of July 2026 was lifted by a conduct adjustment agreement (TAC) on 21 August; On 4 September 2026 the Federal Court suspended the licences and ordered mining to stop until the Baú quilombola community is consulted — the company is appealing and keeping production running.
AMG Brasil <i>Critical Materials N.V., Netherlands — Euronext</i>	Mibra mine • Nazareno (MG)	Dutch publicly traded multinational	Produces concentrate at the Mibra mine , refined at AMG Lithium's own plant in Germany. It raised output from 90,000 to 130,000 t/year of concentrate and plans a new lithium carbonate equivalent plant, with about US\$ 185 million in investment by 2028 (SGB).
CBL <i>Companhia Brasileira de Lítio</i>	Cachoeira mine (Araçuaí) and chemical plant in Divisa Alegre (MG)	Brazilian, privately held	The only vertically integrated producer (concentrate → carbonate/hydroxide). Expansion under way: the mine goes from 50,000 to 115,000 t/year of concentrate (US\$ 90 million) and the refinery from 2,000 to 6,000 t/year; the sale of 33% of CBL Refinaria to India's Altmin (US\$ 40 million) is close to being cancelled.
Atlas Lithium <i>Nasdaq: AT LX</i>	Neves Project (MG)	Founded by Marc Fogassa; Mitsui invested US\$ 30 million and holds an offtake contract	Under construction. The SGB records phase 1 as completed, with 150,000 t/year of concentrate, and phase 2 potentially reaching 300,000 t/year; the company reports 146,000 t/year at 5.5% Li ₂ O, an expansion permit granted in June 2026 and challenged by federal and state prosecutors, 71% of direct capex contracted and first production in 2027.
Pilbara Minerals <i>ASX: PLS</i>	Colina Project • Salinas (MG) — formerly Latin Resources	Large publicly traded Australian producer	Colina Project with a preliminary economic assessment of 499,000 t/year of concentrate at 5.2% Li ₂ O and operations expected to start in 2026 (SGB). It bought ten mineral rights in Salinas from Lithium Ionic , including Baixa Grande, for US\$ 37.5 million.
Lithium Ionic <i>TSX-V: LTH</i>	Bandeira Project , • Itinga (MG) • Baixa Grande (Salinas)	Canadian junior, publicly traded	The Bandeira Project (Itinga) is designed for 178,000 t/year of concentrate and a 14-year mine life (SGB), with environmental licensing expected in 2026 and a final investment decision still pending; It sold the Salinas assets to PLS for US\$ 37.5 million and faces litigation in Canada over project ownership





SIGMA LITHIUM

RESTRUCTURING, DEBT AND REGULATORY PRESSURE

Court suspension

On 4 September 2026 the Federal Court suspended all environmental licences for the **Grota do Cirilo complex**, ordered mining to stop and barred the state from issuing new licences until Incra, the federal land agency, approves the **Quilombola Component Study** and the **quilombola basic environmental plan**, and until free, prior and informed consultation is held with the Baú quilombola community in Araçuaí.

The injunction, in a case brought by the N'Golo federation, **sets a fine of R\$ 100,000 per breach** and orders a survey to measure, within 45 days, **the distance between the mine and the territory** — studies cited in the case put it at 2.7 km, inside the 8 km radius of Interministerial Ordinance 60/2015. The **company disputes the calculation**, says it has not been notified, describes the ruling as issued “without due process” and is keeping operations running.

Shutdown and restart

Grota do Cirilo was idle from October 2025 to January 2026, when the company restructured the mining operation and brought in-house work previously contracted out; production resumed in early 2026.

Finances

It ended 2025 with US\$ 141 million in debt (after paying off 35% of the total during the year). In March 2026 it announced US\$ 146 million in offtake contracts and restarted the second plant, targeting 520,000 t/year in 2027.

In the first half of 2026

It swung to a net profit of US\$ 8.5 million.

In the second quarter of 2026

Revenue was US\$ 55 million, with US\$ 17 million in cash and net debt of US\$ 125 million.

The asset

Drawing on the NI 43-101 report of March 2025, the SGB lists Sigma's measured and indicated resources as 38.3 Mt at Nezinho do Chicão (1.41% Li₂O), 25.6 Mt at Barreiro (1.36%), 14.7 Mt at Xuxa, the only one in production and **the highest grade of the group (1.55%), 14.6 Mt at Murial and 4.2 Mt at Lavra do Meio**.

The comparison between Xuxa and Greenbushes, in Australia, and the jump in declared reserves from 13.4 to 52.4 Mt of pegmatite are the company's own claims.



Mining Observatory

Output below target

Even with the largest capacity in the country, Sigma has struggled to extract and sell spodumene:

in June 2026 it made its first monthly export above a thousand tonnes in the year and had shipped 24,000 t of spodumene and lithium oxide, against an annual target of 240,000 t.



The company blames delays with suppliers and the Labour Ministry's interdiction of the waste piles.

Feam embargo

In July 2026 Feam, the state environmental foundation, embargoed the licences of Sigma's two pits in Itinga and Araçuaí, halting all mining.

A 73-page technical opinion points to undisclosed intervention in permanent preservation areas and watercourses, illegal clearing of vegetation and mining started before the state council's licence.

The company denies wrongdoing

was fined up to US\$ 540,000 for violations dating from 2013 to 2022 and signed a TAC with the state government on 21 August, with about US\$ 1 million in adjustments, resuming mining two weeks before the federal ruling.

The N'Golo quilombola federation went to court against the agreement and obtained the **4 September** injunction, and Feam's regional head in the Jequitinhonha was dismissed after the embargo and reinstated days later.



ATLAS LITHIUM

EXPANSION LICENSED AND CONTESTED

Licence and priority

Atlas (US-based; Neves/Anitta Project, Araçuaí) obtained a ten-year operating licence in October 2024 for up to **1.5 Mt/year of ore**, after an ANM extraction permit for 300,000 t.

the project was given priority status by the Zema state government before the company's Brazilian subsidiary was registered.

Agreement and approval

In May 2026 Atlas signed an agreement with the **N'Golo quilombola federation at the TRF-6 appeals court**, which unlocked the vote; in late June the state environmental council (**Copam**) **approved the expansion by 8 votes to 1 (the ANM against) and three abstentions**, with the Sedese representative absent at the moment of the vote.

Challenge by federal and state prosecutors

In May 2025 the MPF and the MPMG recommended reviewing or **annulling the expansion licences for lack of prior consultation**; an expert report by the federal prosecutor's office found severe water constraints, and a technical opinion identified 248 traditional and quilombola communities in 19 municipalities subject to impacts.



PRICES AND MARKET CONDITIONS

Price cycle

Prices fell more than 80% from 2022 on oversupply and have recovered since mid-2025: concentrate (SC6, CIF China) quadrupled from last year's lows, reached **US\$ 2,413/t** in early 2026 and has since ~~traded in the~~ US\$ 2,200–2,300/t range.

The IEA, in the Global Critical Minerals Outlook 2026 (March), projects lithium demand tripling by 2040 — the sharpest rise among critical minerals — and a supply deficit persisting through 2035.

Market reshuffle

⑥ **Rio Tinto sold Australia's Solis Minerals** the 93,000-hectare exploration project it held between Araçuaí and Salinas, for US\$ 500,000 plus a 1.75% net smelter return royalty;

⑤ **PLS (Pilbara)** closed the purchase of ten Lithium Ionic mineral rights in **Salinas**, including **Baixa Grande**, for US\$ 37.5 million, while the Canadian company faces litigation in Canada.

④ And the sale of 33% of **CBL Refinaria to India's Altmin**, for US\$ 40 million, is close to collapsing over a disagreement on the carbonate price in the offtake contract — CBL is looking for a new partner.

SOCIAL AND ENVIRONMENTAL IMPACTS

LABOUR MINISTRY INTERDICTION

Auditors interdicted 3 of Sigma's 5 waste and tailings piles (December 2025) and issued 13 infraction notices — it was the ministry's first inspection at the company since the NR-22 mining safety rules were tightened after Brumadinho.

The technical opinion found an “extreme” risk of collapse.

a slope failure behind a school in Poço Dantas triggered the action, and the auditor warned that a collapse could reach the Piauí river and community homes.

The ANM's position:

The **ANM disagreed with the interdiction** but issued ten infraction notices for lack of drainage; it had already rated the 2023 mine plan “unsatisfactory” (23 technical requirements) and admitted it lacks funds for inspections.

THE FOUNDER'S COMPLAINT

Calvyn Gardner, Sigma's founder, pointed to pits without proper benches and selective mining of near-surface ore, estimated about **US\$ 140 million to stabilise the North pit** and a similar amount for the South pit, and warned that the Xuxa mine, designed for at least 12 years, risks closing after little more than two; the company denies it.

PROSECUTORS, WATER AND PRIOR CONSULTATION

In **September 2025** the MPF recommended suspending Sigma's permits for lack of prior consultation (ILO Convention 169) and impacts on the Piauí stream, listing as affected the Pankararu/Pataxó, Arana and Maxakali Indigenous peoples and quilombola communities in Araçuaí.

In **September 2026** the Federal Court granted a request by the N'Golo federation and suspended the Grota do Cirilo licences until the Baú quilombola community is consulted; its territory lies about 2.7 km from the directly affected area.

COURT DISPUTES

In May 2026, in a public civil action brought by the MPMG, the court in Araçuaí spoke of a **“massive violation of human dignity”**, halted noisy operations between 10 pm and 6 am under a daily fine of R\$ 500,000, ordered a R\$ 50 million deposit and required resettlement, an alternative road and audits of noise, dust and vibration.

On 9 June the state appeals court (TJMG) overturned the deposit while keeping the independent technical advice; **residents reported night-time operations in breach of the ruling**. In September, the licence suspension for lack of consultation with quilombola communities added further uncertainty to Sigma's operations.

SCIENTIFIC EVIDENCE

The LIQUIT project (UFMG, Unimontes, UFVJM and London South Bank) called for extraction to be halted and, in a technical note of May 2025, pointed to flaws in the licensing process and the absence of prior consultation.

Findings compiled by the magazine Pesquisa Fapesp **show aluminium above reference limits in soil and water around the mines**, and MPMG data cited in 2026 record fine particulate matter (PM2.5) above the annual limit at every monitoring point in 2023.

SHRINKING A PROTECTED AREA

An NGO named in **Operation Rejeito** paid R\$ 8,000 for a study that underpinned a cut of more than 50% in the **Chapada do Lagoão** protected area (from 24,800 to 10,700 hectares), **favouring lithium mining in the region**.

PUBLIC MONEY

A change in the **Climate Fund ceiling allowed a R\$ 487 million BNDES loan to Sigma** despite the social and environmental warnings; the July 2026 embargo cooled the disbursement.

SETTLEMENTS AND FAMILY FARMING

The search for lithium (and copper) in Bahia and Paraíba threatens rural settlements; the Federal Public Defender's Office filed a public civil action in 2025 to revoke Incra Normative Instruction 112/2021, which allows mining in settlements. **The normative instruction nevertheless remains in force.**

TERRITORIAL EXPANSION

Lithium applications have already reached the Legal Amazon:

There are 53 requests, 29 of them less than 10 km from protected territories, affecting 21 areas.

5 Indigenous lands, 8 conservation units and 8 settlements — with 74% concentrated in southern Tocantins.

PRESSURE ON THE PRESS

Sigma sent extrajudicial notices to Observatório da Mineração (April 2025 and again in July 2026).

The intimidation is now being examined by the MPF, the MPMG, the Federal Public Defender's Office and FIDH.

GEOPOLITICAL QUESTIONS

PUBLIC MARKETING

The state of Minas Gerais (under governor Romeu Zema) and the Ministry of Mines and Energy launched what they called the "Lithium Valley" in New York to attract investors, a move questioned by organisations and researchers in the region.

NATIONAL POLICY

In September 2026 the Senate approved Bill 2780/2024, creating the **National Policy for Critical and Strategic Minerals (PNMCE)**, reported by senator Eduardo Braga (MDB-AM) and now awaiting presidential approval.

The text keeps the **R\$ 2 billion guarantee fund and R\$ 5 billion in tax credits over five years**, creates the National Council for the Industrialisation of Critical Minerals (CIMCE), with power to homologate corporate transactions, and includes iron ore among the strategic minerals.

Social and environmental organisations criticise incentives without counterparts; the private sector criticises the government's weight on the council.

DEPENDENCE ON CHINA

China dominates global refining and is the main destination of Brazilian concentrate: 97% of the value exported in 2024, according to the ANM. Chinese decisions on quotas and output move the price received by exporters.

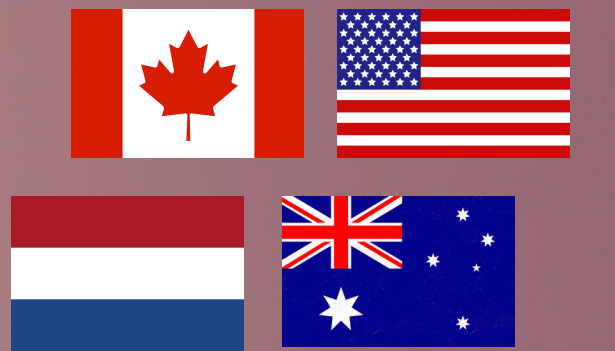


TRADE DIPLOMACY

In February 2026 the **United States** proposed a critical minerals agreement with a floor price, investment in refining and technology transfer; as of September 2026 no federal agreement had been signed. In March, the summit organised by the US embassy in São Paulo took place without federal officials from the Lula government, and progress came through memoranda with states such as Goiás. The impasse pits Brazil's demand for local processing against the floor price defended by Washington.

FOREIGN CONTROL

Capital is mostly foreign: **Canada** (Sigma, through a holding company; Lithium Ionic), the **Netherlands** (AMG), the United States (Atlas) and **Australia** (Pilbara). **CBL is the Brazilian exception.**



UNCERTAINTIES AND THE MEDIUM-TERM OUTLOOK

PRICE

Viability depends on the price of spodumene, which is highly volatile (a fall of more than 80% in 2022–2024, partial recovery in 2025–2026).

Consultancies project rising demand, but the record advises caution with linear projections.

SIGMA

The largest producer is weighed down by the court suspension of its licences (September 2026) pending consultation with the Baú quilombola community, by the solidity of its operational restart and by the regulatory liabilities open with Feam, the ANM and the Labour Ministry. **The August TAC ended the state embargo but does not settle the prior-consultation requirement.**

MOVING UP THE CHAIN

Without chemical conversion plants at scale, Brazil is likely to remain a concentrate exporter, capturing a small share of the chain's value; CBL's expansions and the PNMCE have not yet changed that picture.

OVERSIGHT IN CRISIS

The Federal Police indicted the ANM's director-general and senior officials for criminal organisation (Operations Rejeito and Parcoures), and the agency admits it lacks resources.

An accelerated mineral cycle with weak oversight repeats the conditions that preceded Mariana and Brumadinho.

LITIGATION

Actions by the MPF, the Federal Public Defender's Office and the MPMG over prior consultation, water and structural safety may affect schedules and licences, including those of new entrants.

A case at the Supreme Court (July 2025) challenges the legality of mining in the valley.

2026–2030 OUTLOOK

With favourable prices and permits, the entry of Lithium Ionic, Atlas and Pilbara/Colina could multiply output towards 100,000 t of LCE a year by 2030.

In the opposite scenario — low prices, litigation and a crisis in oversight — the likeliest outcome is project delays and concentration in the lowest-cost assets.

WHAT THE STUDIES AND REPORTS SAY (2024–2026)

Global outlook

The **Global Critical Minerals Outlook 2026**, published by the IEA, projects lithium demand tripling by 2040 — the sharpest rise among critical minerals — with a supply deficit persisting through 2035, and shifts the concern from "meeting demand" to "securing supply chains".

Brazilian technical institutions

In February 2026 the SGB published the latest edition of its overview **"An Overview of Critical and Strategic Minerals Potential of Brazil"**, launched at PDAC, which brings together reserves, production, exports, exploration investment and projects by mineral, using ANM volumes and USGS ranking positions.

The **survey considers Brazil's potential underestimated** and signed a four-year technical agreement with CETEM (2025) for critical minerals studies.

Geology of the deposits

A synthesis in **Economic Geology (2025)** shows that, among the 12 pegmatite districts of the Eastern Brazilian Province (~150,000 km²), only the Araçuaí district concentrates spodumene-rich deposits, with more than half a billion tonnes of ore.

Carbon footprint

A life-cycle assessment published in the journal Mining (MDPI, July 2025) estimates 1,220 kg of CO₂e per tonne of lithium carbonate equivalent in Brazilian concentrate, with the largest share (37.4%) coming from the manufacture of the ammonium nitrate used in explosives; wind or solar power would cut the impact by 22.7% and 14.7%.

