Rare Earths (REE)

Base Year 2025

World Production

387.4 thousand t of TREO (contained)

+1.0%

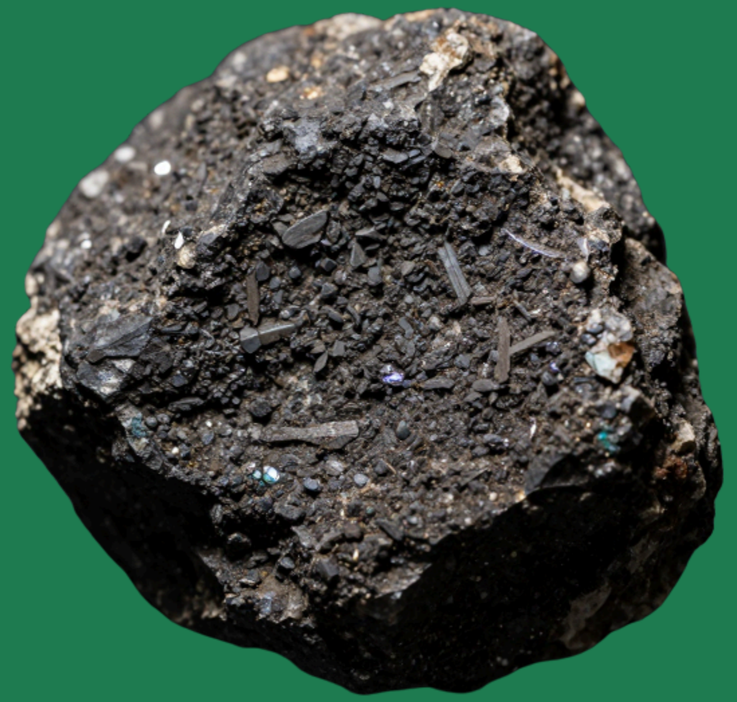
Brazil Production

40 t of TREO (contained)

-73.3%

National Highlight

R$ 493.6 million in investments



Trade Balance

↓ Deficit of USD 15.7 million

Exports

USD 14.9 million

+246.7%

Mining Royalties (CFEM)

R$ 1.9 million

-34.2%

% Change 2025 vs 2024

What are Rare Earths?

The Rare Earth Elements (REE) group comprises 17 chemical elements: those with atomic numbers 57 to 71, forming the lanthanide series, plus yttrium (Y) and scandium (Sc), which have similar physicochemical properties. They are classified by atomic mass and ionic radius into:

- Light REE (LREE): Lanthanum (La), Cerium (Ce), Praseodymium (Pr), Neodymium (Nd), Promethium (Pm) and Samarium (Sm).
- Heavy REE (HREE): Europium (Eu), Gadolinium (Gd), Terbium (Tb), Dysprosium (Dy), Holmium (Ho), Erbium (Er), Thulium (Tm), Ytterbium (Yb), Lutetium (Lu) and Yttrium (Y). Sc is treated separately.

Occurrence

Rare Earth Elements occur in nature associated with more than 250 minerals, notably those of commercial interest:

- Monazite $(La,Ce,Th)PO_4$,
- Bastnäsite $(La,Ce,Nd)CO_3F$,
- Xenotime $(Y,Dy,Yb)PO_4$
- Euxenite $(Y,Ca,Ce,U,Th)(Nb,Ta,Ti)_2O_6$
- Chevkinite $(Ce,La,Ca,Th)_4(Fe^{2+},Mg)(Fe^{2+},Ti,Fe^{3+})_2(Ti,Fe^{3+})_2(Si_2O_7)_2O_8$.
- Ionic clays (ionic adsorption clays).

Deposits are associated with ionic clays (72.8%), alkaline-carbonatite complexes (12.0%), pegmatites (7.6%), coastal placers (1.1%) and other undifferentiated types (6.5%) (SGB, 2026).

Main Applications

Their applications extend to the production of permanent magnets and components for wind turbines and hybrid cars, which may have an impact on the energy transition.

They are also important for automotive catalysis and petroleum cracking. Other applications include pigments, glass and ceramic polishing, and high-tech products such as miniaturized batteries, lasers and fiber-optic amplifiers, phosphors and superconductors.

Rare earths are used in high-performance (Nd, Pr, Dy, Tb)FeB permanent magnets, applied in wind turbines and electric vehicles. Nd and Pr provide the flux density and resistance to demagnetization that maximize magnetic strength and motor torque, while Dy and Tb are added to the magnet structure to increase coercivity and ensure thermal stability at high operating temperatures.

1. World Supply

In 2025, according to the United States Geological Survey (USGS), world rare earth production totaled about 387.4 thousand tonnes of total rare earth oxides (contained TREO), an increase of 1.0% over the previous year. China was the main producer (69.7%), followed by the United States (13.2%), Australia (7.5%) and Myanmar (5.7%). Brazil accounted for 0.01% of world production, with 40 t (contained TREO).



Monazita | Euxenita | Argila Iônica

Table - Main rare earth producing countries (contained TREO) - 2025

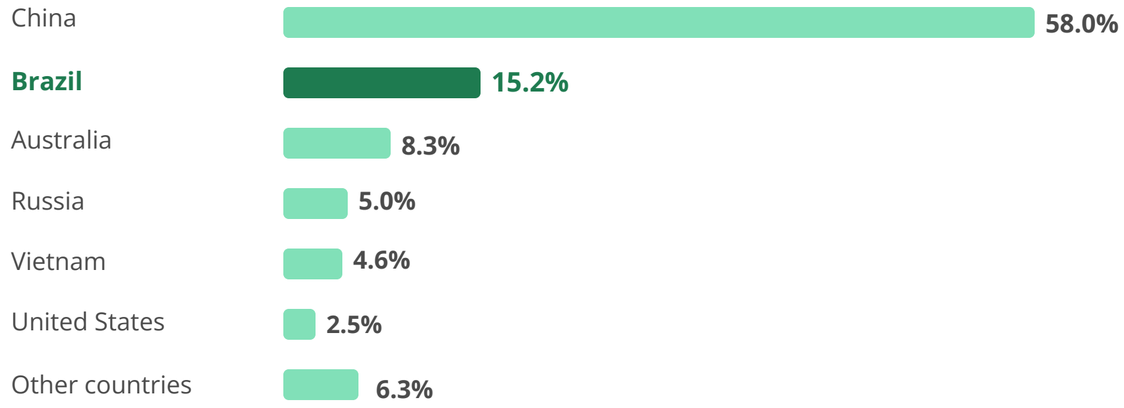
Country	Production (t)	Share (%)
Brazil	**40**	**0.01**
China	270,000	69.7
United States	51,000	13.2
Australia	29,000	7.5
Myanmar	22,000	5.7
Thailand	4,800	1.2
Other Countries	10,510	2.7
Total	**387,350**	**100.0**

Source: Brazil: ANM (beneficiated concentrate production, contained TREO); other countries: USGS - Mineral Commodity Summaries 2026. Total adjusted with Brazilian data.

2. Reserves

According to the USGS and updated data for Brazil, world rare earth reserves totaled about 75.8 million tonnes (contained TREO) in 2025, concentrated in China (44.0 Mt), Brazil (11.5 Mt), Australia (6.3 Mt), Russia (3.8 Mt), Vietnam (3.5 Mt) and the United States (1.9 Mt). Brazil holds the world's 2nd largest reserve, with 15.2% of the total.

Distribution of the Main World Rare Earth Reserves - 2025 (%)





Brazilian rare earth reserves total about 11.5 million tonnes (contained TREO) and correspond to the proven and probable reserves declared by companies in the Annual Mining Report (RAL), base year 2025, in accordance with ANM Resolution 94/2022.

Sources: Brazil: ANM (RAL 2026, base year 2025); other countries: USGS - Mineral Commodity Summaries 2026.

3. Domestic Production

In 2025, beneficiated production of rare earth concentrate was 40 t (contained TREO), resulting from the mining of the ionic clay deposit of Serra Verde Pesquisa e Mineração Ltda., in the municipality of Minaçu-GO. Production decreased by 73.3% compared to 2024 (150 t).

Year	2024	2025
Rare earths (TREO, t)	150	40



Serra Verde's production consists of Mixed Rare Earth Carbonate (MREC), obtained from ionic clays, with grades expressed as total rare earth oxides (TREO). The concentrate stands out for its neodymium (Nd), praseodymium (Pr), dysprosium (Dy) and terbium (Tb) contents, elements that are essential for electric motors and wind turbines due to their magnetic properties and stability at high temperatures.

Source: ANM

4. Foreign Trade

In 2025, the rare earth sector recorded a trade **deficit of USD FOB 15.7 million.**



Mineral Sector Exports

Total: USD FOB 14.9 million
Variation: +246.7%

Main destinations:
- China (80.2%)
- France (7.3%)
- Argentina (2.3%)

Mineral Sector Imports

Total: USD FOB 30.6 million
Variation: -6.7%

Main origins:
- China (63.1%)
- United States (8.5%)
- France (7.2%)

Source: Open Data/Ministry of Development, Industry, Trade and Services (MDIC) and COMEXMIN/ANM

- Data include the Mineral Extractive Industry (IEM) and the Mineral Transformation Industry (ITM)

***FOB** = The seller fulfills its obligations and responsibilities when the goods, cleared for export, are delivered, stowed on board the vessel at the port of shipment, both indicated by the buyer, on the date or within the agreed period.

Foreign trade: main products of the mineral extractive industry (IEM) in 2025

Main Exported Products

	NCM 25309030 - Rare earth metal ores
USD FOB	348
EXP Share (%)	100.0

Main Imported Products

	NCM 25309030 - Rare earth metal ores
USD FOB	17,069
IMP Share (%)	100.0

Foreign trade: main products of the mineral transformation industry (ITM) in 2025

Main Exported Products

	NCM 28469090 - Other compounds of rare earth metals, of yttrium, etc.	NCM 36069000 - Ferrocerium and other pyrophoric alloys
USD FOB	11,973,650	1,314,892
EXP Share (%)	80.2	8.8

Main Imported Products

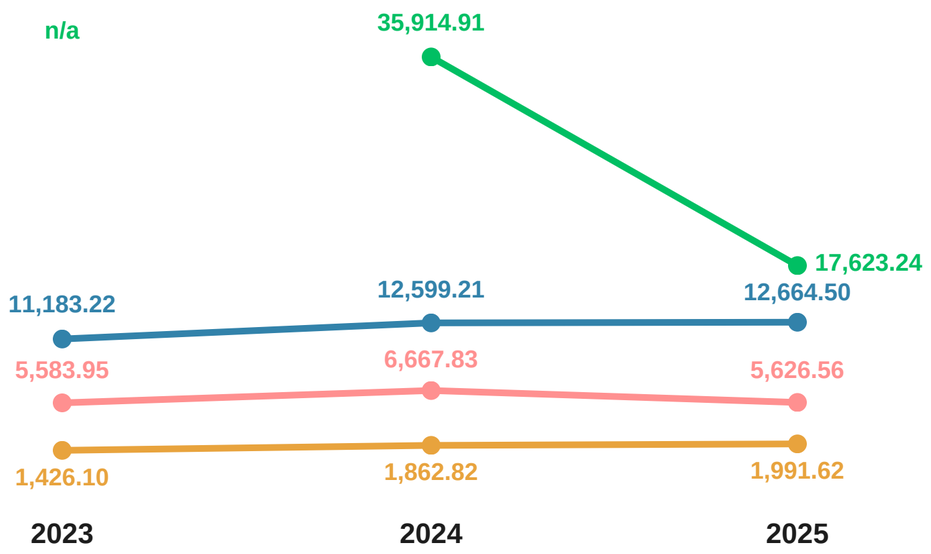
	NCM 85051100 - Permanent magnets and articles for magnets, of metal	NCM 38159093 - Other catalytic preparations (rare earth oxides)
USD FOB	16,695,804	6,498,156
IMP Share (%)	54.6	21.2

Source: Open Data/Ministry of Development, Industry, Trade and Services (MDIC) and COMEXMIN/ANM

5. Prices

Prices reflect the dynamics of the international market and are influenced by factors such as global demand, production costs and economic fluctuations.

Chart – Average FOB prices - USD/t - Last 3 years



Other rare earth compounds, of yttrium, etc. (exports)

NCM: 28469090 | Change 2025/2024: −50.9%

Ferrocerium and other pyrophoric alloys (exports)

NCM: 36069000 | Change 2025/2024: +0.5%

Other catalytic preparations – rare earth oxides (imports)

NCM: 38159093 | Change 2025/2024: −15.6%

Other rare earth compounds, of yttrium, etc. (imports)

NCM: 28469090 | Change 2025/2024: +6.9%

n/a: not available. Average price = FOB value (USD) ÷ quantity (net kg) × 1,000.

Source: Open Data/Ministry of Development, Industry, Trade and Services (MDIC).

***FOB** = The seller fulfills its obligations and responsibilities when the goods, cleared for export, are delivered, stowed on board the vessel at the port of shipment, both indicated by the buyer, on the date or within the agreed period.

6. Financial Compensation for the Exploitation of Mineral Resources (CFEM)

In 2025, CFEM, Brazil's mining royalty, collected on rare earths totaled R$ 1.9 million, a decrease of 34.2% compared to 2024 (R$ 2.9 million).

Company	Amount (R$)	Share (%)
Serra Verde Pesquisa e Mineração Ltda.	1,894,331	97.3
Indústrias Nucleares do Brasil S.A. – INB	53,311	2.7
Total	**1,947,642**	**100.0**

Source: ANM.

7. Investments and Mining Rights

Investments in rare earths in 2025 were close to half a billion reais, evenly divided among mineral exploration, mines and processing plants.

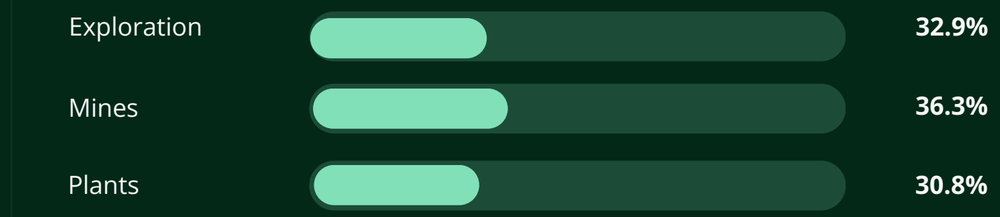
Investments in Mining

In 2025, total investments in rare earths amounted to R$ 493.6 million. Mineral exploration totaled R$ 162.4 million, according to the Mineral Exploration Investment Statement (DIPEM), an increase of 80.7% compared to 2024. Investments in mines and plants totaled R$ 331.2 million, 99.9% of them in Goiás.

Main States

- BA (46.3%)
- GO (36.9%)
- MG (8.8%)

Investment Breakdown



Mining Rights 2025

Main States

- MG (146 permits)
- BA (94 permits)
- PE (69 permits)

Mineral Exploration

- 516 new exploration permits
- -62.7% compared to 2024
- 25 exploration reports approved

Mining Applications

- 6 mining applications filed

Mining Concession / PLG

- 1 mining concession granted
- 1 PLG granted

8. Relevant Factors

In 2025, the only rare earth mine in operation in the country was Pela Ema (Serra Verde, Minaçu-GO), in the ramp-up phase. The main rare earth exploration projects under development in Brazil are listed below:

Project	Company (exchange: ticker)	State	Municipalities	Stage	Deposit type	Rock type	Main minerals
Ema	Brazilian Critical Minerals (ASX: BCM)	AM	Apuí	Scoping; BFS underway; licensing	Ionic clay (ISR)	Weathered granite/acid volcanics	Clay minerals with adsorbed REE
Pitinga (REE)	Mineração Taboca (CNMC)	AM	Presidente Figueiredo	Internal studies	Primary in granite	Albite granite (Madeira)	Xenotime; cassiterite; pyrochlore
Monte Alto / Rocha da Rocha	Brazilian Rare Earths (ASX: BRE)	BA	Ubaíra, Irajuba	Advanced exploration; metallurgy	Hard rock + monazite placer	High-grade rocks (Jequié Block); sands	Chevkinite; monazite
Campo Grande	Equinox Resources / Eminence Minerals (ASX: EMA)	BA	Jequié	Exploration	Ionic clay	Weathered granulitic rocks	Clay minerals with adsorbed REE
Jequié	Australian Mines (ASX: AUZ)	BA	Jequié, Dário Meira	Exploration	Ionic clay + eluvial monazite	Weathered granulitic rocks	Clay minerals; monazite
Down Under	Gold Mountain (ASX: GMN)	BA	Irajuba, Varzedo	Exploration	Ionic clay + hard rock	Granulitic and intrusive rocks	Clay minerals; REE-Nb-U-Sc minerals
Pela Ema	Serra Verde Pesquisa e Mineração (privately held)	GO	Minaçu	Production (ramp-up)	Ionic clay	Weathered granite	Clay minerals with adsorbed REE (Nd, Pr, Tb, Dy, Y)
Carina	Aclara Resources (TSX: ARA)	GO	Nova Roma	PFS; EIA filed	Ionic clay	Weathered granite	Clay minerals with adsorbed REE (Dy, Tb)
PCH	Appia Rare Earths & Uranium (CSE: API) / Ultra Rare Earth	GO	Iporá	Exploration (MRE)	Carbonatite + ionic clay	Carbonatite breccia; weathering mantle	REE phosphates; pyrochlore (Nb); apatite (P)
Iporá	Atlas Critical Minerals (OTCQB: JUPGF)	GO	Iporá	Early exploration	Ionic clay / laterite	Weathered alkaline rocks	Clay minerals with adsorbed REE
Caldeira	Meteoric Resources (ASX: MEI)	MG	Caldas, Poços de Caldas	PFS; LP	Ionic clay	Weathered nepheline syenite/phonolite	Clay minerals (halloysite, kaolinite) with adsorbed REE
Colossus	Viridis Mining & Minerals (ASX: VMM)	MG	Poços de Caldas, Caldas	PFS; LP	Ionic clay	Weathered nepheline syenite/phonolite	Clay minerals (halloysite, kaolinite) with adsorbed REE
Araxá	St George Mining (ASX: SGQ)	MG	Araxá	Exploration (MRE)	Laterite over carbonatite	Carbonatite (Barreiro Complex)	Monazite; pyrochlore (Nb)
Tiros	Resouro Strategic Metals (ASX: RAU; TSXV: RSM)	MG	Tiros, São Gotardo	Exploration (MRE)	Ti-REE laterite	Mata da Corda Group volcanics	Anatase (Ti); REE phosphates
Raptor	Perpetual Resources (ASX: PEC)	MG	Poços de Caldas	Exploration	Ionic clay	Weathered alkaline rocks	Clay minerals with adsorbed REE
Caladão	Axel REE (ASX: AXL)	MG	Padre Paraíso	Exploration (MRE)	Ionic clay (+Ga)	Weathered granite	Clay minerals with adsorbed REE; Ga

REE: rare earth elements; ISR: in situ leaching; BFS: bankable feasibility study; PFS: pre-feasibility study; MRE: mineral resource estimate; EIA: environmental impact assessment; LP: preliminary license. Source: ANM, based on information disclosed by the companies.

8. Relevant Factors (cont.)

AMAZONAS

• Ema Project – Apuí/AM | Brazilian Critical Minerals (ASX: BCM; Australia). Ionic adsorption clay (IAC); MRE of 943 Mt @ 716 ppm TREO (Indicated: 248 Mt @ 759 ppm). ISR pilot in 2025: more than 2,000 L of PLS ($MgSO_4$ 0.5 M; pH ≤ 4). Scoping study (1Q2025): CAPEX of US$ 55 million; BFS started in 07/2025. Utilization guides (2 × 3,000 t/y TREO) filed in 04/2025.

• Pitinga Project – Presidente Figueiredo/AM | Mineração Taboca S.A. (CNMC, China, since 11/2024). Madeira albite granite, producing Sn-Nb-Ta; heavy REE in xenotime as a potential by-product; no REE resources disclosed.

BAHIA

• Monte Alto Project – Ubaíra and Irajuba/BA | Brazilian Rare Earths (ASX: BRE; Australia). Hard rock with chevkinite and monazite sands; 75,670 m drilled (12/2023–2025). Grades of up to 35.3% TREO; 27.6 m @ 19.4% TREO; NdPr up to 59,645 ppm; DyTb up to 3,050 ppm; associated Nb, Sc, Ta and U. Ore sorting from 12.4% to 27% TREO, with ~91% TREO recovery. Offtake with Carester (150 t/y Dy-Tb).

• Campo Grande Project – Jequié/BA | Equinox Resources (ASX: EQN; now Eminence Minerals, ASX: EMA; Australia). IAC over granulitic rocks; 1,801 km². Desorption of up to 80% TREO (NdPr 88%, Dy 88%, Tb 91%); 4 m @ 1,595 ppm TREO (35% MREO); surface sample of up to 17,346 ppm TREO. Exploration phase.

• Jequié Project – Jequié and Dário Meira/BA | Australian Mines (ASX: AUZ; Australia). 82,568 ha (45 titles). In 02/2025, 72 auger holes (500.6 m); South (IAC): 15 m @ 1,720 ppm TREO, including 3 m @ 3,055 ppm; North (monazite): 9 m @ 1,028 ppm; 69% of samples above 400 ppm. Exploration phase.

• Down Under Project – Irajuba and Varzedo/BA | Gold Mountain (ASX: GMN; Australia). IAC and REE-Nb-U-Sc hard-rock targets in a 245 km corridor. Hole IRAD299: 15 m @ 1,849 ppm TREO (41.1% MREO/TREO), including 8 m @ 2,215 ppm; MREO/TREO up to 70.8%; 183 sediment samples in Varzedo. Exploration phase.

GOIÁS

• Pela Ema Project – Minaçu/GO | Serra Verde Pesquisa e Mineração (privately held; USA/United Kingdom). The only REE mine in operation in the country: ionic clay over granite, with a mixed Nd-Pr-Tb-Dy-Y concentrate. Target of 4.8–6.5 thousand t/y TREO (2027); the DFC (USA) approved an investment of up to US$ 465 million (Nov 7, 2025).

• Carina Project – Nova Roma/GO | Aclara Resources (TSX: ARA; Canada/Peru). Dy-Tb-rich IAC over granite; 1,682 holes/24,564 m; Indicated resources of 236 Mt @ 1,572 ppm and Inferred of 48 Mt @ 1,288 ppm; probable reserve of 165.4 Mt @ 1,723 ppm TREO. PFS (Nov 6, 2025): CAPEX of US$ 680.5 million, NPV8 of US$ 1.07 billion, IRR of 21.8%, 4,265 t REO/y and an 18-year mine life. EIA filed with SEMAD-GO (May 29, 2025); start-up planned for 2H2028.

• PCH Project – Iporá/GO | Appia Rare Earths & Uranium (CSE: API; Canada), operated by Ultra Rare Earth (50%). Carbonatite + IAC; 42,932 ha. Indicated resources of 6.6 Mt @ 2,513 ppm and Inferred of 46.2 Mt @ 2,888 ppm TREO (NI 43-101), with Nb_2O_5 and P_2O_5 by-products. In 2025, 7 diamond drill holes (1,513.5 m) of a 7,000 m campaign and 244 auger holes.

• Iporá Project – Iporá/GO | Atlas Critical Minerals Corp. (OTCQB: JUPGF; USA/Brazil). IAC/laterite; 18,615 ha, 12 titles. In Jun–Jul/2025, 18 auger holes (171 m); maximum of 1 m @ 3,822 ppm TREO (1,803 ppm MREO); several holes above 1,000 ppm over 8–11 m; average desorption of 44% MREO and 36% TREO. Early exploration phase.

8. Relevant Factors (cont.)

MINAS GERAIS

• Caldeira Project – Caldas and Poços de Caldas/MG | Meteoric Resources (ASX: MEI; Australia). IAC in an alkaline complex; 72 titles. MRE of 1,497 Mt @ 2,359 ppm; probable reserve of 103 Mt @ 4,091 ppm TREO; in 2H2025, 358 aircore/auger holes (8,688 m). PFS (07/2025): CAPEX of US$ 443 million, AISC of US$ 13.07/kg, 13,584 t REO/y and IRR of 28% (pre-tax). MREC pilot (12/2025); Preliminary License (COPAM) on Dec 22, 2025.

• Colossus Project – Poços de Caldas and Caldas/MG | Viridis Mining & Minerals (ASX: VMM; Australia). IAC in an alkaline complex; MRE of 493 Mt @ 2,508 ppm TREO (Measured + Indicated: 329 Mt @ 2,680 ppm). Scoping study (Feb 25, 2025); PFS (Jul 9, 2025): CAPEX of US$ 358 million, C1 cost of US$ 6.20/kg, 9,448 t TREO/y, NPV of US$ 899 million, IRR of 34% and a 20-year mine life. Preliminary License (COPAM) on Dec 19, 2025; production planned for 2028.

• Araxá Project – Araxá/MG | St George Mining (ASX: SGQ; Australia). Laterite over the Barreiro carbonatite; asset acquired from Itafos in 02/2025. MRE of 40.6 Mt @ 4.13% TREO and 41.2 Mt @ 0.68% Nb_2O_5. At East Araxá (RC): 48 m @ 5.71% TREO, peaking at 16.87% TREO and 4.06% Nb_2O_5; diamond drilling: 15 m @ 12.27% TREO and 1.61% Nb_2O_5.

• Tiros Project – Tiros and São Gotardo/MG | Resouro Strategic Metals (ASX: RAU; TSXV: RSM; OTCQB: RSGOF; Canada). Ti-REE laterite over Mata da Corda Group volcanics; 28 concessions, 497 km². MRE (Apr 9, 2025): Measured + Indicated of 1.4 Gt @ 12% TiO_2 and 4,000 ppm TREO; Inferred of 0.5 Gt @ 3,700 ppm; core of 104 Mt @ 23% TiO_2 and 9,100 ppm TREO. TiO_2 + MREC route under testing; exploration phase.

• Raptor Project – Poços de Caldas/MG | Perpetual Resources (ASX: PEC; Australia). IAC in the alkaline complex; option over 4 licenses (3.8 km²); Portão Verde, Pina Colada and Pinheirinho targets. Auger (~10 m): 5 m @ 5,591 ppm TREO (35% NdPr) and 12 m @ 4,601 ppm; ANSTO tests indicated recoveries of up to 94% of Nd-Pr-Tb-Dy. 30–40 m aircore drilling scheduled for the first MRE.

• Caladão Project – Padre Paraíso/MG | Axel REE Ltd (ASX: AXL; FSE: HN8; Australia). Gallium-bearing IAC over granites; ~430 km². In 2025, 355 auger holes (4,416.5 m) in Area B. MRE (Dec 23, 2025): 572 Mt @ 1,506 ppm TREO and 439 Mt @ 38 ppm gallium (Area A: 233 Mt @ 2,133 ppm; Area B: 339 Mt @ 1,075 ppm, inferred). $MgSO_4$ leaching: 464 ppm soluble TREO (42% MREO).

Projects in other states also stand out (São Paulo, Piauí, Paraná, Rio Grande do Sul, Tocantins and Roraima, among others).

Project information sources (click to access):

Ema – asx (Jul 28, 2025)
Campo Grande – listcorp (Oct 14, 2024)
Pela Ema – mining.com (Nov 7, 2025)
Iporá – atlascriticalminerals.com (Sep 16, 2025)
Araxá – asx.com.au (Sep 17, 2025)
Caladão – asx (Dec 23, 2025)
Pitinga (REE) – poder360 (Nov 28, 2024)
Jequié – australianmines.com.au
Carina – aclara-re.com, PFS (Nov 6, 2025)
Caldeira – asx.com.au, Annual report (FY2025)
Tiros – asx.com.au (Aug 12, 2025)
Monte Alto / Rocha da Rocha – asx.com.au, Annual report 2025
Down Under – asx (Oct 29, 2025)
PCH – newsfilecorp (Dec 9, 2025)
Colossus – minedocs, PFS (Jul 9, 2025)
Raptor – asx.com.au (Jul 31, 2025)