Silicon (Si)

Ferrosilicon (Fe-Si) and silicon metal (Si) markets

Base Year 2025

World Production

5.0 Mt of Fe-Si
4.6 Mt of Si metal

+8.7% | -16.4%

Brazil Production

314 kt of Fe-Si
171 kt of Si metal

-6.0% | -17.8%

National Highlight

Minas Gerais and Bahia (~49.0% and 36% of production)

Mineral Sector Trade Balance

Surplus of USD 711.7 million

-9.7%

Mineral Sector Exports

USD 782.2 million

-9.7%

Mining Royalties (CFEM)

R$ 1.82 million

-37.8%

% Change 2025 vs 2024

What is Silicon?

Silicon (Si) is one of the most abundant elements in the Earth's crust, accounting for about 28% of its composition.

Industrially, silicon is produced by reducing silica in electric furnaces, yielding silicon metal (high purity) and ferrosilicon, in addition to other products of the production chain downstream of mining.

Occurrence

Silicon occurs mainly in silica-rich minerals such as quartz, quartzite and silica sands, found in several regions of the world. Countries with abundant reserves of high-purity quartz and competitive electricity supply, as is the case of Brazil, tend to concentrate the production of ferrosilicon and silicon metal, which are essential for the metallurgical, chemical and technology chains.

Main Applications

Ferrosilicon is used in the manufacture of steels and ferroalloys, helping to improve the mechanical properties and metallurgical quality of products. Silicon metal has higher value-added applications, being used in the production of aluminum and other alloys, silicones, silicon-based chemicals and semiconductors for the electronics industry and photovoltaic solar panels.



Silicon is one of the most important elements for modern life. Present in essential technologies, it is used in the manufacture of computers, mobile phones and electronic equipment, among other uses. It also plays a key role in the production of glass and construction materials. Its versatility contributes to economic development, technological innovation and the transition to more sustainable energy sources.

1. World Supply

This section presents global production data for ferrosilicon and silicon metal (mineral transformation industry), indicating their relevance on the international stage.

In 2025, world ferrosilicon production was approximately 5.0 Mt, while silicon metal production was around 4.6 Mt, representing growth of 8.7% and a decrease of 16.4%, respectively, compared to 2024.



Brazil ranked 2nd worldwide in silicon metal production and 3rd in ferrosilicon production in 2025.

Table 1 - Main ferrosilicon and silicon metal producing countries (t, gross weight) - 2025

Country	Ferrosilicon	(%)	Silicon Metal	(%)
Brazil*	**314,000**	**6.3%**	**171,000**	**3.7%**
China	3,500,000	70.0%	4,000,000	86.9%
Russia	420,000	8.4%	35,000	0.8%
Norway	150,000	3.0%	130,000	2.8%
Malaysia	120,000	2.4%	---	---
Kazakhstan	120,000	2.4%	7,000	0.2%
France	21,000	0.4%	68,000	1.5%
Australia	---	---	47,000	1.0%
Other Countries	355,000	7.1%	142,000	3.1%
Total	**5,000,000**	**100.0%**	**4,600,000**	**100.0%**

Source: Adapted from USGS (2026) and *ABRAFE (2026)

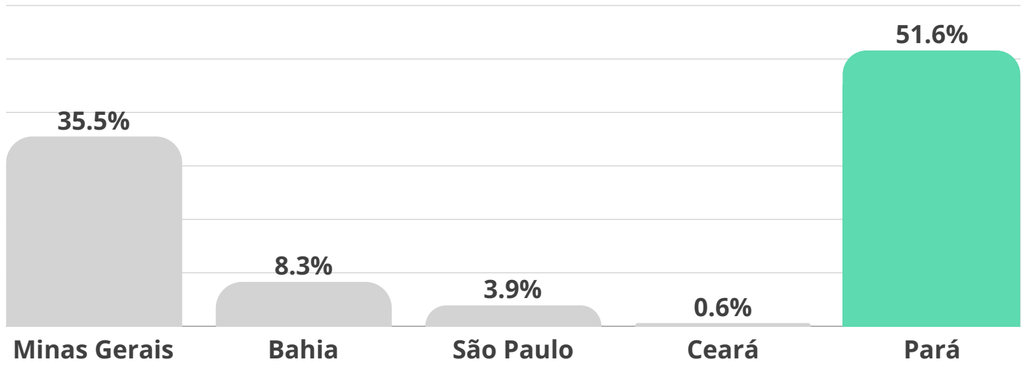
Sources: ABRAFE (2025; 2026); USGS - Mineral Commodity Summaries (2025; 2026).

2. Reserves

Global quartz reserves are abundant and widely distributed, with no comparative data available. However, the availability of economically viable high-purity quartz (HPQ) deposits is limited to a few locations. The main HPQ producers and resource holders include the United States, Australia, Brazil, India, Russia and China (USGS, 2026).

In 2025, Brazilian reserves (proven + probable) totaled 128.8 Mt, comprising 86.6 Mt of proven reserves and 42.2 Mt of probable reserves, distributed as shown in the chart below:

Distribution of the Main Brazilian Quartz Reserves – 2025



Source: ANM.



Brazil's proven (86.6 Mt) plus probable (42.2 Mt) quartz reserves for the ferrosilicon and silicon metal markets totaled 128.8 Mt in 2025 for mining concession holders. This figure may be higher, since there is no legal obligation to report mineral resource and reserve data under the small-scale mining permit (PLG) regime.

3. Domestic Production

Brazilian production of silicon ore (especially quartz) for the ferrosilicon and silicon metal markets reflects the country's operational capacity and its regional concentration.

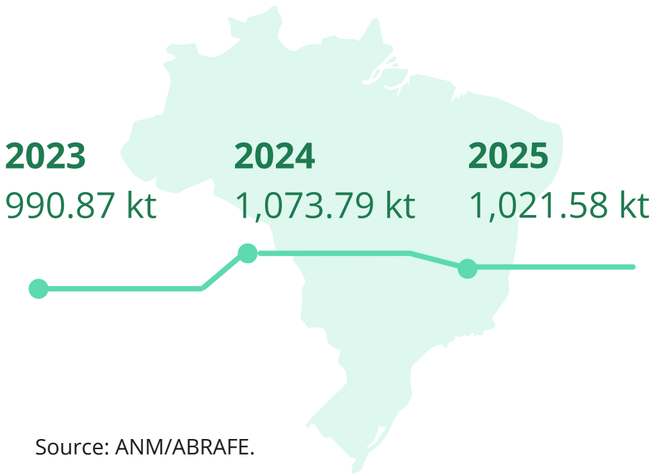
In 2025, about 1.02 Mt of industrial quartz was produced, a decrease of 4.9% compared to 2024 (1.07 Mt).

Quartz is the ore that undergoes treatment processes (crushing, screening and concentration, as applicable) to be used in the production of ferrosilicon (≥98.5% SiO_2) and silicon metal (≥99.9% SiO_2).

The State of Minas Gerais remains the main production hub, with:
500.1 thousand t of quartz produced
49.0% of national production

Brazilian Production of Industrial Quartz (1,000 t)

Last 3 years



Source: ANM/ABRAFE.

4. Foreign Trade

Foreign trade in the ferrosilicon and silicon metal markets highlights Brazil's competitiveness in the international market. In 2025, these markets together recorded a trade surplus of USD FOB 711.66 million.



Mineral Sector Exports

Total: USD FOB 782.2 million
Decrease: -9.7%

Main destinations:
United States (29.1%)
Japan (13.3%)
Germany (5.7%)

Mineral Sector Imports

Total: USD FOB 70.55 million
Decrease: -9.9%

Main origins:
China (28.3%)
India (23.5%)
Paraguay (10.6%)

Source: Open Data/Ministry of Development, Industry, Trade and Services (MDIC) and COMEXMIN/ANM.
***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.
Note: The consolidated values refer to the product basket (NCMs: 25051000, 25061000, 25062900, 71041000, 28046100, 28046900, 72022100, 72022900, 72023000, 72025000, 72028000, 72029100), including the Mineral Extractive Industry (IEM) and the Mineral Transformation Industry (ITM).

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

Main Exported Products

	NCM 25061000 - Quartz	NCM 25051000 – Silica sands and quartz sands
USD FOB	21,039,270	896,389
EXP Share (%)	95.9	4.1

Main Imported Products

	NCM 25061000 - Quartz	NCM 25051000 – Silica sands and quartz sands
USD FOB	380,962	4,513,780
IMP Share (%)	7.8	92.2

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

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

Main Exported Products

	NCM 28046900 – Other silicon	NCM 72022100 – Ferrosilicon, containing by weight more than 55% of silicon
USD FOB	419,008,931	270,180,304
EXP Share (%)	55.1	35.5

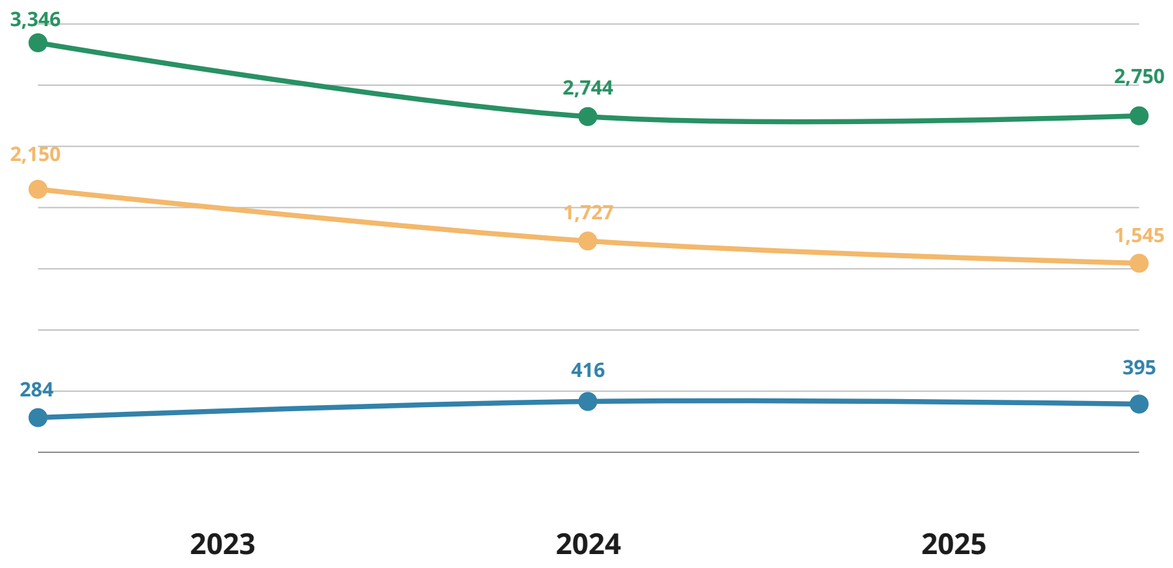
Main Imported Products

	NCM 72023000 – Ferro-silico-manganese	NCM 72029100 – Ferro-titanium and ferro-silico-titanium
USD FOB	16,968,782	12,795,217
IMP Share (%)	25.8	19.5

5. Prices

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

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



- NCM 28046900 – Other silicon (exports)
- NCM 72022100 – Ferrosilicon, containing by weight more than 55% of silicon (exports)
- NCM 25061000 – Quartz (exports)

Source: Open Data/Ministry of Development, Industry, Trade and Services (MDIC) and COMEXMIN/ANM.
*USD FOB/t = 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)

The collection of the Financial Compensation for the Exploitation of Mineral Resources (CFEM), Brazil's mining royalty, reflects the economic contribution of mining to the country, showing the distribution of revenues among producing states and the share of the main companies in total collections.

CFEM - Quartz (2025)

- Total collection: R$ 1.82 million
- Variation: -37.8% compared to 2024 (R$ 2.93 million)

Main contributing states

- Minas Gerais (54.0%)
- Bahia (44.7%)
- Ceará (1.1%)

Main contributing companies



Collections fell significantly compared to 2024.

The strong concentration in the states of Minas Gerais and Bahia reflects the centralization of national industrial quartz production.

Source: ANM.

7. Investments and Mining Rights

Investments in industrial quartz mining are concentrated in Minas Gerais, which accounted for 81.0% of the amount invested in 2025.

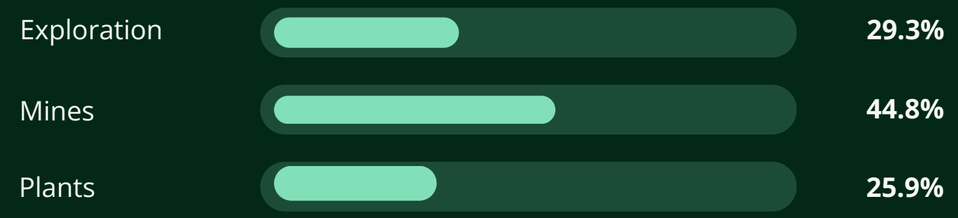
Investments in Mining

In 2025, according to the Mineral Exploration Investment Statement (DIPEM) and the Annual Mining Report (RAL), investments in quartz mining totaled R$ 27.04 million, 29.3% in mineral exploration and 70.7% in the mining phase, an increase of 2.3% over the previous year.

Main States

- MG (81.0%)
- BA (9.5%)
- RR (3.0%)
- CE (1.4%)

Investment Breakdown



Mining Rights Granted in 2025

Mineral Exploration

- 478 new exploration permits
- -6.8% compared to 2024
- 33 approved final exploration reports

Main States

- MG (153 permits)
- BA (143 permits)
- CE (38 permits)

Mining Applications

- 30 mining applications

Mining Concession / PLG / Utilization Guide

- 16 mining concessions
- 15 small-scale mining permits (PLG)
- 39 utilization guides

Source: ANM.

8. Relevant Factors

In recent years, the silicon market has been dominated by an oversupply of Chinese polysilicon: between 2023 and 2025, capacity grew much faster than solar demand, pushing prices below cost and causing multibillion-dollar losses for manufacturers such as LONGi, JA Solar and Tongwei, which forced production cuts and mass closures (utilization below 40% at times).

Energy costs also weighed on the sector, as production is electricity-intensive: in China, producers relying on hydropower in the southwest face seasonal cuts during the dry season.

On the demand side, solar energy remained the main driver, complemented by silicon-anode batteries for EVs and the AI-driven expansion of semiconductors.

Protectionism increased: in September 2026, the European Commission officially opened an interim review of the anti-dumping duties applied to silicon metal from China. The European industry (led by Euroalliages and Ferroglobe) is pressing for the current rates, which range between 16.3% and 16.8%, to be raised substantially, arguing that Chinese subsidies and overcapacity continue to distort prices in the bloc (Source: https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32022R1394).

In Brazil, the Canadian company Homerun Resources Inc. (TSXV: HMR; B3 BDR: HMRN31) controls operations in the Santa Maria Eterna silica district in Belmonte (BA), the "Silica Valley", with mining rights totaling more than 60 million tonnes of resources (measured, inferred and potential) across four CPRM leases (SME I, II, III and new regional concessions), in areas with mineral potential of more than 200 million tonnes of high-purity quartz silica (SiO_2 grades between 99.2% and 99.6%+). The company's project portfolio also includes a silica purification plant (capacity of 350,000 t/year for solar, optical, photonic, semiconductor and technical quartz applications) and a solar glass factory (capacity of 365,000 t/year), both in the state of Bahia. (Source: Homerun Resources Inc.)