Vanadium (V)

Base Year 2025

World Production

113.0 thousand tonnes of vanadium (metal)

-4.3%

Brazil Production

9.0 thousand t of V_2O_5 (contained)

-20.5%

National Highlight

Bahia (100% of vanadium production, in Maracás)

Trade Balance

↑ Surplus of USD 60.7 million

Exports

USD 71.0 million

-14.6%

Mining Royalties (CFEM)

R$ 0.49 million

-92.9%

% Change 2025 vs 2024



What is Vanadium?

Vanadium (V) is a transition metal element, atomic number 23, characterized by high mechanical strength and corrosion resistance.

Occurrence

In Brazil, vanadium occurs mainly associated with:

- Vanadiferous titanomagnetite deposits in Maracás (BA), notably the Maracás Menchen Mine;
- Magmatic deposits in layered intrusions, such as the Rio Jacaré Sill (BA);
- Titaniferous magnetite and iron-titanium oxide minerals; and
- Fe-Ti-V deposits, as a co-product of iron-titanium ore.

Main applications

Vanadium is used mainly as an alloying element in special steels (ferrovanadium) and in vanadium redox flow batteries (VRFB), being applied in:

- high-strength metal alloys and superalloys;
- chemical and industrial catalysts;
- long-duration energy storage systems (VRFB); and
- cutting tools and structural components.



Vanadium is a strategic mineral for the energy transition. Its use has grown with the expansion of energy storage systems and critical mineral supply chains.

1. World Supply

In 2025, according to the United States Geological Survey (USGS), world vanadium (metal) production totaled 113.0 thousand tonnes, a decrease of 4.3% compared to the previous year.



Table 1 – Main vanadium producing countries (contained V) – 2025

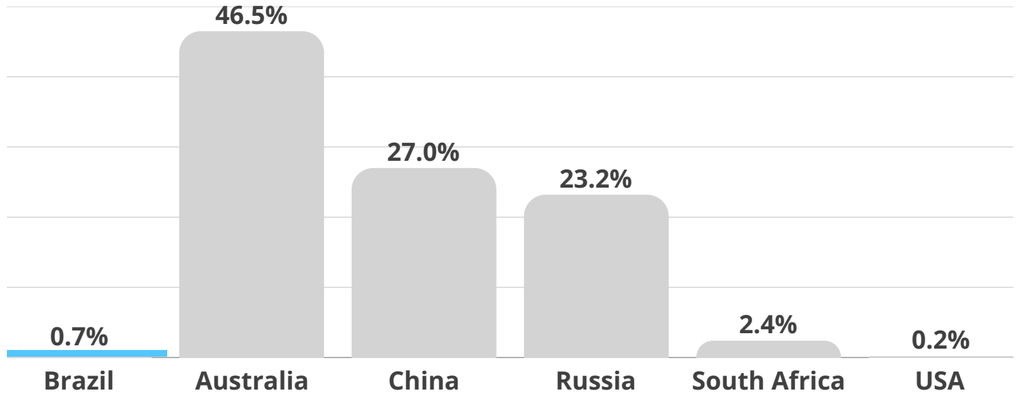
Country	Production (t)	Share (%)
Brazil	**5,023**	**4.4**
China	82,000	72.6
Russia	21,000	18.6
South Africa	5,000	4.4
Total	**113,023**	**100.0**

Source: ANM; USGS-Mineral Commodity Summaries 2026. Brazil's production corrected relative to the USGS figure.

2. Reserves

According to the United States Geological Survey (USGS), in 2025 world vanadium reserves are around 21.5 million tonnes, distributed as follows (in thousand t): Australia (10,000), China (5,800), Russia (5,000), South Africa (520), Brazil (140) and United States of America (50).

% Distribution of the Main World Vanadium Reserves – 2025



Brazilian vanadium reserves (proven and probable), reported in the Annual Mining Report (RAL), total 29.8 million tonnes of ore, equivalent to 250,343.1 t of V_2O_5 contained (140,192.2 t of metal) — about 0.7% of world reserves.

In Brazil, vanadium reserves are mainly associated with:

- Vanadiferous titanomagnetite deposits associated with mafic-ultramafic complexes;
- Magmatic deposits in layered intrusions;
- Mineralizations associated with titaniferous magnetite, in which vanadium occurs as an element contained in iron and titanium oxide minerals;
- Fe-Ti-V deposits, in which vanadium can be recovered as a co-product or by-product of iron-titanium ore processing;
- Potential occurrences in sedimentary and phosphate rocks and carbonaceous materials, although without the same economic relevance as the primary vanadiferous titanomagnetite deposits.

Sources: USGS - Mineral Commodity Summaries 2026; ANM (Brazilian reserves).

3. Domestic Production

Brazilian processed production in 2025 reached 389.5 thousand t of vanadium concentrate, equivalent to 8,966.72 t of V_2O_5 contained. The only producing state is Bahia, where operations are carried out in the municipality of Maracás by Vanádio de Maracás S.A., which belongs to the Canadian group Largo Resources.

Over the last three years, the V_2O_5 contained in the concentrate behaved as shown in the table below:

Year	2023	2024	2025
V_2O_5 contained in Concentrate (t)	11,620	11,279	8,966.72



Source: Largo Inc

Source: ANM

4. Foreign Trade

In 2025, vanadium foreign trade recorded a surplus of USD FOB 60.7 million.



Mineral Sector Exports

Total: USD FOB 71.0 million
Variation: -14.6%

Principal destinations:
Netherlands (39.0%)
United States of America (25.3%)
Canada (18.7%)

Mineral Sector Imports

Total: USD FOB 10.3 million
Variation: +10.3%

Principal origins:
China (52.5%)
Austria (22.2%)
Czech Republic (7.0%)

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

- 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

	No exports of vanadium IEM products in 2025
USD FOB	—
EXP Share (%)	—

Main imported products

	No imports of vanadium IEM products in 2025
USD FOB	—
IMP Share (%)	—

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

Main exported products

	NCM 28253010 - Divanadium pentoxide	NCM 72029200 - Ferrovanadium
USD FOB	64,610,247	3,683,842
EXP Share (%)	91.0	5.2

Main imported products

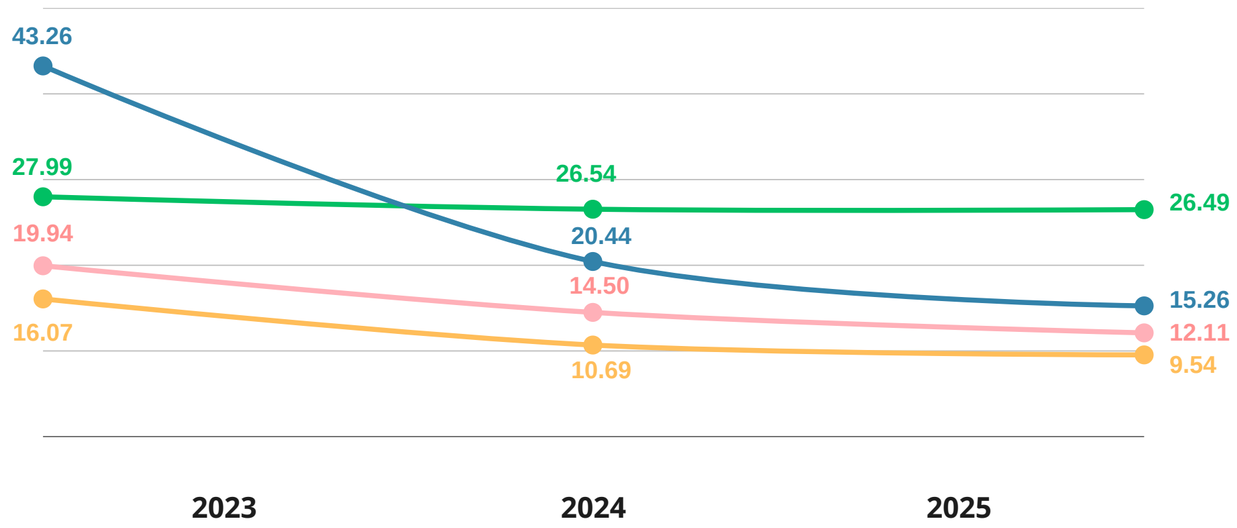
	NCM 72029200 - Ferrovanadium	NCM 28253010 - Divanadium pentoxide
USD FOB	9,202,528	571,189
IMP Share (%)	89.2	5.5

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

5. Prices

Vanadium prices on the international market are influenced by supply and demand factors, including production levels, industrial consumption, inventories and economic expectations in the main consumer markets.

Chart – Average FOB prices - USD/kg net - Last 3 years



- NCM 28419030 - Vanadates (Imports)
  Unit: USD FOB / kg net*
- NCM 72029200 - Ferrovanadium (Exports)
  Unit: USD FOB / kg net*
- NCM 28253090 - Other vanadium oxides and hydroxides (Exports)
  Unit: USD FOB / kg net*
- NCM 28253010 - Divanadium pentoxide (Exports)
  Unit: USD FOB / kg net*

Source: Open Data/Ministry of Development, Industry, Trade and Services (MDIC)
***USD FOB/kg net** = 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)

Over the last five years, collections of CFEM, Brazil's mining royalty, on vanadium extraction evolved as follows: growth between 2021 and 2024, followed by a sharp decline in 2025, when the amount collected totaled R$ 489,596.06.

Year	Total Amount Paid (R$)
2021	3,474,994.14
2022	4,469,026.41
2023	5,282,450.91
2024	6,924,356.00
2025	489,596.06

Source: ANM.

7. Investments and Mining Rights

Vanadium investments are strongly concentrated in the processing plant stage, reflecting the investments made by Vanádio de Maracás S.A. in its processing unit.

Investments in mining

In 2025, according to data from the Mineral Exploration Investment Declaration (DIPEM) and the Annual Mining Report (RAL), investments in vanadium mining totaled R$ 17.57 million: R$ 2.0 million in mineral exploration (11.4%), R$ 78.6 thousand in the mine (0.4%) and R$ 15.5 million in the processing plant (88.2%).

Main States

- Bahia (88.6%)
- Pará (11.4%)

Investment Share



Mining Rights 2025

Main States

- SE (5 permits)
- PE (3 permits)
- MA, MT, PI (1 each)

Mineral Exploration

- 11 new exploration permits published

Final Exploration Reports

- 5 filed (4 in Bahia, 1 in Pará)
- 1 approved (in Bahia)

Mining Application

- No mining applications in 2025

Source: ANM.

8. Relevant Factors

In 2025, vanadium consolidated its position as a strategic mineral for the global energy transition. Highlights included the completion in China of the largest vanadium redox flow battery energy storage system (200 MW/1 GWh), technological advances by Sumitomo Electric that reduced costs and extended the service life of VRFBs (Vanadium Redox Flow Batteries), the expansion of commercial applications in microgrids in Japan and the formation of a vanadium electrolyte supply chain in the United States.

EIT Raw Materials increased its investments in the Finnish Novana project, aimed at producing vanadium pentoxide from steel slag. The project intends to produce about 9 thousand tonnes per year of V_2O_5, equivalent to more than 40% of current European demand.

These events reinforce the growing relevance of vanadium for long-duration energy storage systems and for the security of global critical mineral supply chains.